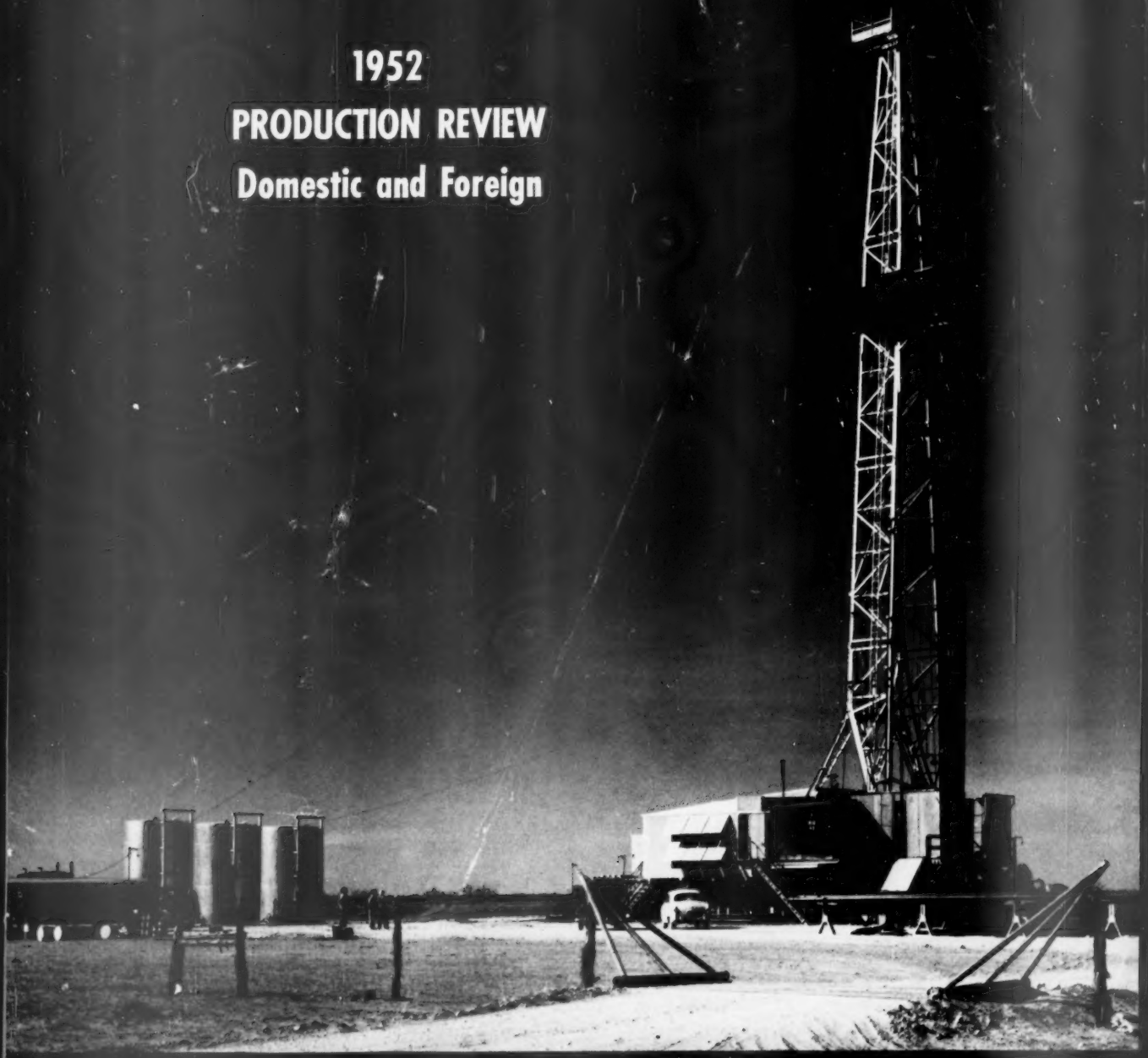
JOURNAL OF

Petroleum Technology

1952
PRODUCTION REVIEW
Domestic and Foreign



MARCH, 1953

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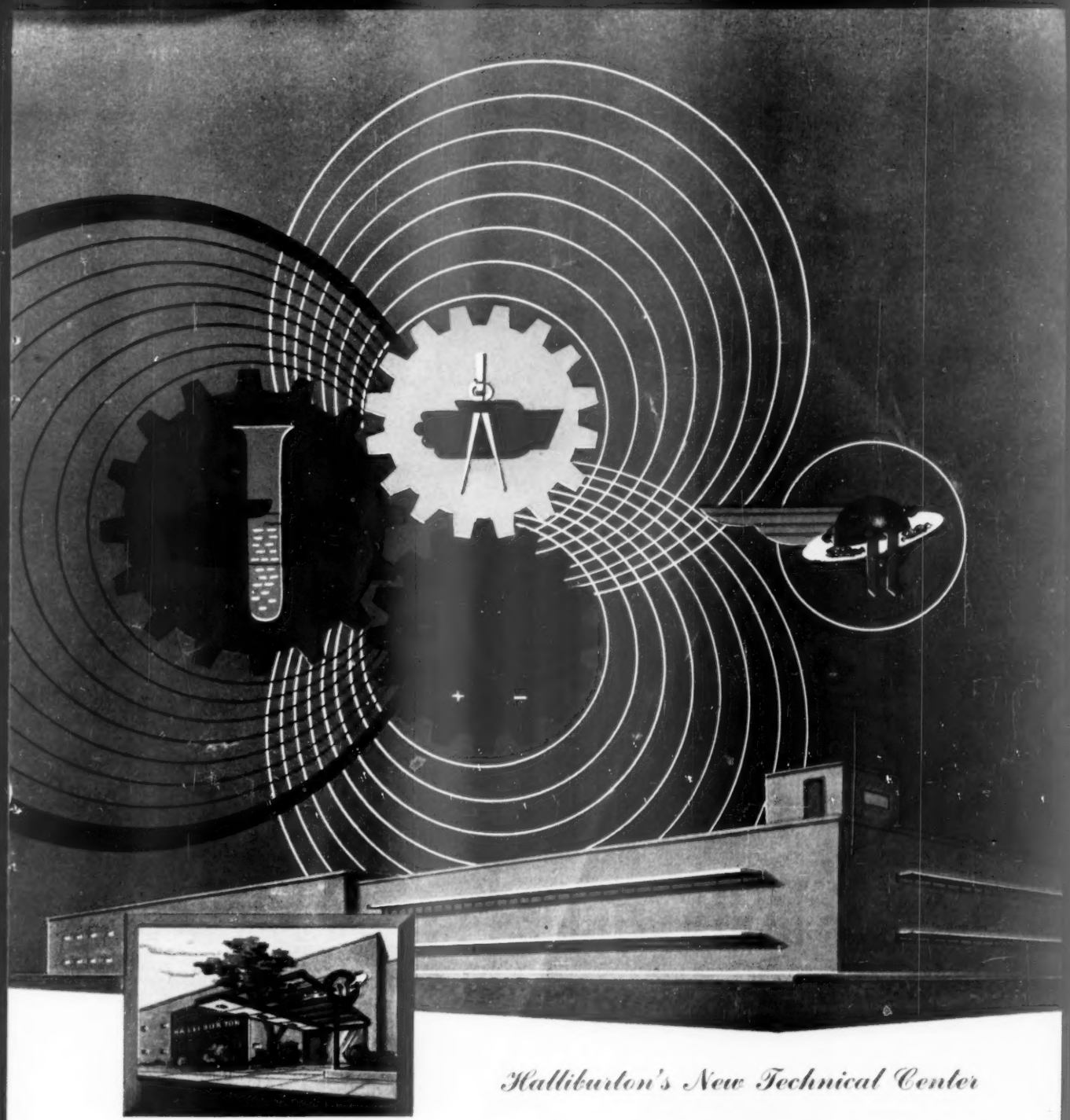

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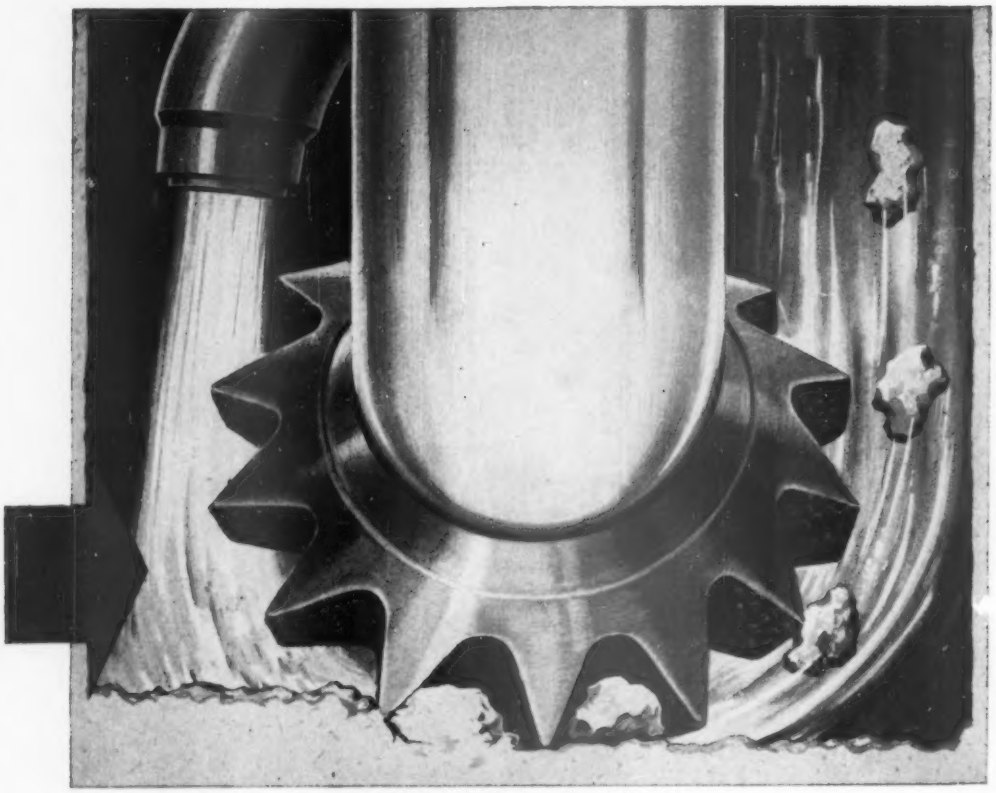

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Official Publication of the

PETROLEUM BRANCH
American Institute of Mining and Metallurgical Engineers, Inc.

800 Fidelity Union Bldg.
Dallas, Texas

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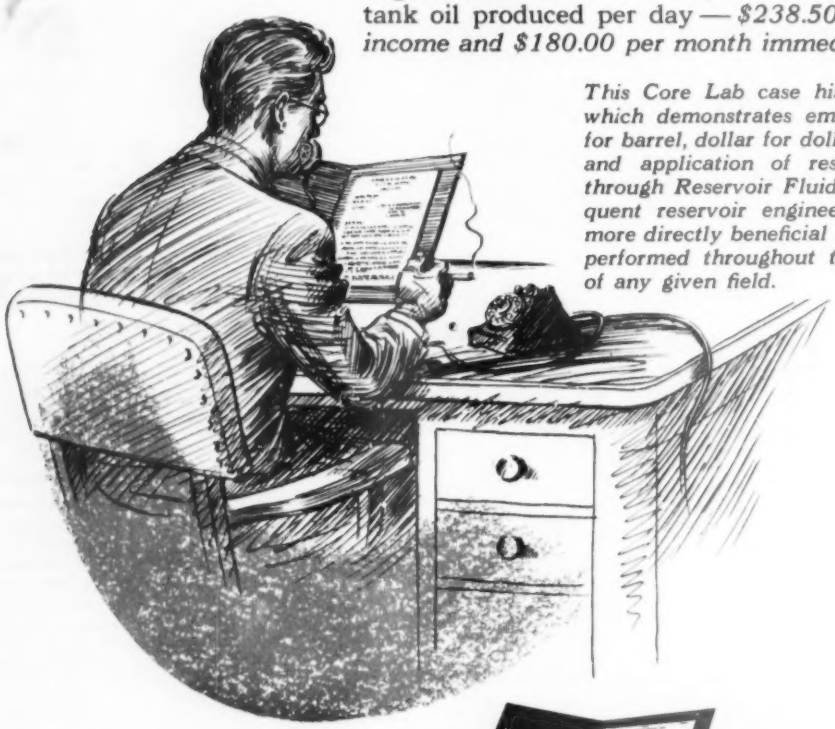

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JOURNAL OF
Petroleum Technology

Vol. V MARCH, 1953 No. 3

CONTENTS

Editorial Features — Section 1

1952 Production Review
United States, by Milton Williams, Harold J. Clark and L. W. Chasteen 11
Canada, by E. W. Shaw 17
South America, by DeGolyer and MacNaughton, Inc. 19
Middle East, by A. H. Chapman 23
Europe, by A. H. Chapman 27
Far East, by E. W. Berlin 29
Africa, by A. H. Chapman 31

Petroleum Transactions

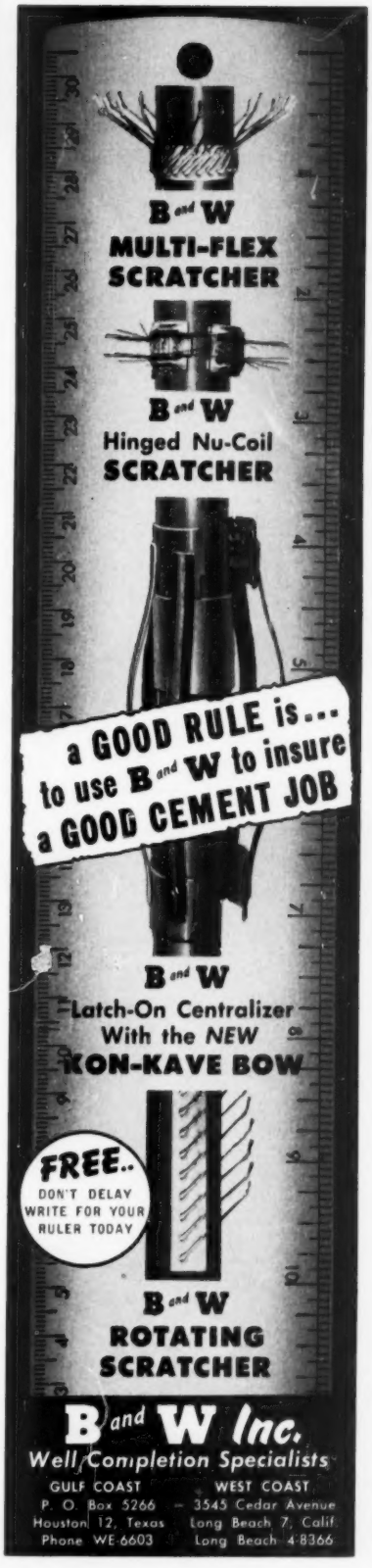
Pressure Gradients in Natural Gas Reservoirs, by David Cornell and Donald L. Katz 61
Relative Permeability Calculations from Pore Size Distribution Data, by N. T. Burdine 71
Calculations of Unsteady-State Gas Flow through Porous Media, by G. H. Bruce, D. W. Peaceman, H. H. Rachford and J. D. Rice . . 79

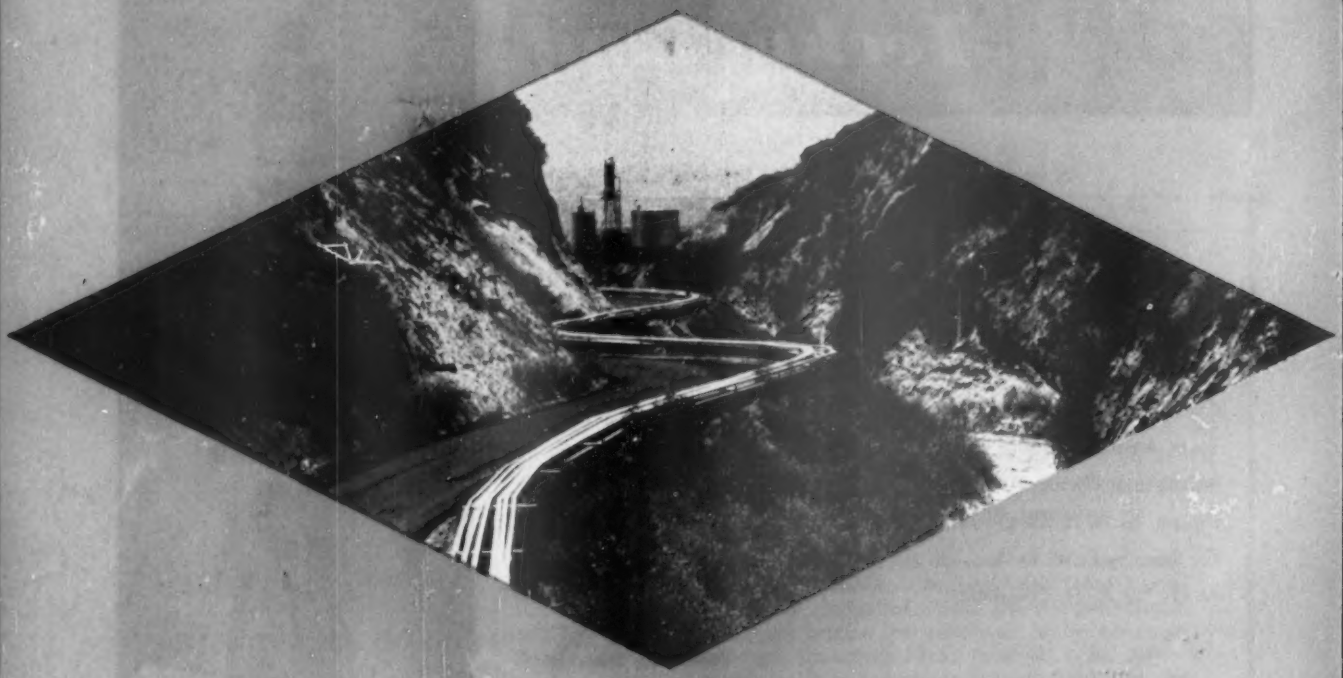
Institute Affairs — Section 2

Petroleum Branch Affairs, by Jess E. Adkins 1
2,500 Attend AIME Annual Meeting 2
Schedule of Local Section Meetings 3
Petroleum Branch Membership 4
Employment Notices 7
Personals 8
Advertisers' Index 12

THIS MONTH'S COVER

Domestic and foreign development and production during 1952 are summarized in a series of articles beginning on page 11 of this issue. The articles are taken from reports compiled by the AIME Production Review Committee and presented at the Annual Meeting last month. In the cover picture, Humble Oil and Refining Co.'s Rig 43 drills a well in the Midkiff Field in West Texas. Crews using this jackknife derrick brought in the discovery well





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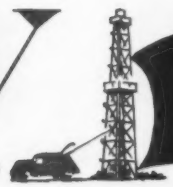

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. . . Advantages of Glass Jet Units

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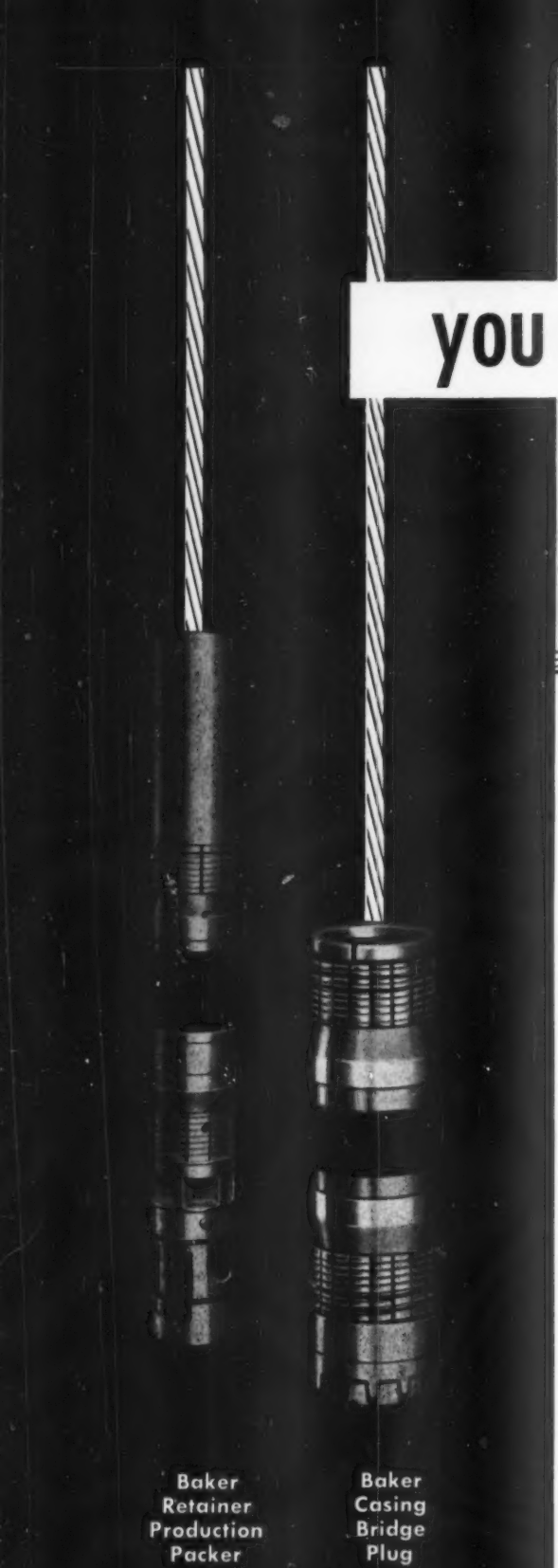

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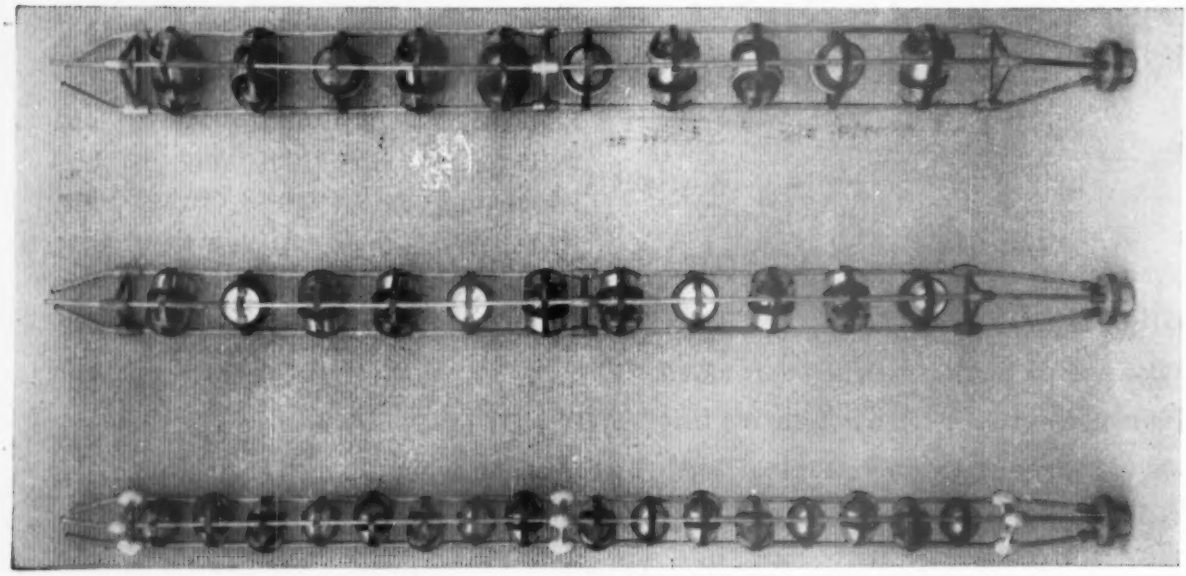

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UNITED STATES - A Review of 1952 Production

By Milton Williams, Harold J. Clark and L. W. Chasteen

The authors of this report on United States production and development during 1952 presented this comprehensive material at the Annual Meeting of the AIME last month at Los Angeles. It is a summary of domestic data to be included in Vol. 7, Statistics of Oil and Gas Development and Production.

To the optimist, the picture of 1952 domestic drilling and production is overwhelming. To the pessimist, there may be some features which may cause him some concern.

From the standpoint of effort expended, the industry has reached new highs. More wells were drilled in the United States during 1952 than in any previous year. More of the total wells drilled were exploratory wells than have ever been drilled before. The total footage drilled soared to a new record and more oil, gas and natural gasoline were produced than in any previous year.

From the standpoint of results of exploratory drilling, there must remain the usual uncertainty which always attends the appraisal of current results. Certainly many new fields and pools were discovered during the year, and certainly some of these will prove to be of major importance. Just how prolific 1952's discoveries will be must be left to the future.

DRILLING

Total Wells

In drilling activities, the total number of wells drilled in 1952 was about 45,800. This includes wells of all categories — development and exploratory, producing, both oil and gas, and dry holes. It also includes some 1,500 wells drilled for injection or disposal.

The 1952 total is, of course, an all-time record. It is higher by about 1,300 wells than the previous record set during 1951, and is roughly twice the yearly average of wells drilled during the war years of 1942 to 1945. A comparison of the total actually achieved during 1952 with that estimated from the trend of increasing activity established during previous years shows an accord which should warm the cockles of a statistician's heart.

Still looking at wells of all categories, we find that the total footage drilled during 1952 represents an all-time high. This footage reflects not only the record number of wells drilled, but also a greater average depth of wells. Close to 190 million ft of hole — about 35,500 miles — was drilled in the United States in 1952, compared with the past record of about 172 million ft of hole drilled in 1951. The average depth of all wells drilled in 1952, for the first time, was greater than 4,000 ft. The 1952 average depth was about 4,100 ft, which is significantly greater than that of about 3,900 ft established in 1951 as the record up to that time.

The trend toward increasing average depth is also reflected, not only in the average depth of all wells, but also in a decline in the number of wells less than 2,500 ft in depth, and an increase in the number of wells greater than 10,000 ft in depth.

It is gratifying from the standpoint of efficiency of drilling operations that 1952's records in total completions and in footage were accomplished with only a small increase in the average number of rigs running over the number for the previous year.

Let us look, for a moment, at the areas in which significant changes in drilling activity have taken place. Perhaps the most talked about increase in activity is that which has taken place in the oil provinces of the Rocky Mountain area. Colorado, Utah, Montana, Nebraska and North Dakota have been the scenes of much drilling activity, and although the number of wells representing an increase over those of the previous year may not be staggering, the activity of the area is certainly notable.

New Mexico's increase in activity has been phenomenal. Both the total number of wells drilled and footage made were up about 50 per cent over the corresponding figure for 1951, which was a record year.

Texas, which accounts for some 35 per cent of the total number of wells drilled and for almost half of the footage drilled, showed only a small increase in wells and footage drilled over 1951's record. Actually, the figures for the state as a whole do not reflect the entire story. Some areas declined in the number of wells drilled and others increased. West Texas wells totaled slightly less than the year before, but the footage drilled increased slightly.

In California, more wells were drilled than in 1951, but fewer were drilled than in 1948 or 1949. In Louisiana, more wells were drilled than in 1951, but less than in 1950. In many areas there was a resurgence of drilling superimposed on a downward trend of activity.

Of the total wells drilled, some 33,700 were development wells other than those drilled for injection or disposal and about 10,600 were exploratory wells. Without regard to this distinction, of the total wells about 23,500 were completed as oil wells, about 3,300 as gas wells, and approximately 17,600, or almost 39 per cent, were dry. The percentage of dry holes continues to increase from year to year along a trend established over a period of some years.

Exploratory Wells

In exploratory drilling, the record of approximately 10,600 exploratory wells drilled in 1952 constitutes a small increase over 1951's 10,300 wells and represents about the same ratio of exploratory to total wells. Wells drilled in the 1952 search were, on the average, slightly deeper than those drilled in 1951. The average wildcat of 1952 was drilled to about 4,500 ft, as compared with 1951's 4,200+ ft. The total wildcat footage drilled in 1952 was equivalent to about 9,000 miles.

Turning to the areas in which exploratory activities took place, the most notable increases were in the Rocky Mountain area — Colorado, Utah, Montana, Wyoming, Nebraska, and

the Dakotas. These states together contributed 800 wildcat wells to the nation's total, as compared with a few more than 500 in the same states in 1951.

New Mexico's exploratory wells, like her total wells, increased by 50 per cent in 1952 over 1951.

Exploratory wells drilled in Texas during 1952 accounted for over 4,800 of the nation's total wildcats, or about 45 per cent of the total. This record number of wildcats resulted from increased activity over the entire state. The wildcat footage drilled in Texas during the year was equivalent to about 4,500 miles of hole.

California and Louisiana both recorded increases in the number of exploratory wells over those drilled in 1951. In both states, the total wildcat footages were up markedly. Oklahoma's total of wildcats for the past year was less than recorded in 1951, as were the totals for Kansas, Illinois, Indiana, Michigan and Mississippi.

With regard to the success of exploratory drilling conducted during the year, of the total of about 10,600 exploratory wells, approximately 1,500 were completed as oil producers, about 300 were completed as gas wells, and roughly 8,800 were dry. Thus, the nationwide success ratio was one producer for every six exploratory wells drilled. The percentage of successful completions was slightly less than that for 1951, and follows the downward trend which has characterized late years.

The highest percentage of successful completions in any state was recorded by New Mexico. Here more than 31 per cent of the exploratory wells drilled were completed as producers of oil or gas. The percentages of successful completions were slightly higher in Texas and in Louisiana than in the rest of the nation. Kansas, Illinois, Kentucky, Indiana, and Michigan had lower percentages than that representing the national average, as did California, Colorado, Montana and Nebraska. What was perhaps the most disheartening wildcatting record in any state was that racked up in Florida, where 10 wildcats drilled during the year failed to find either oil or gas.

PRODUCTION

As in drilling, 1952 set an all-time record in production of petroleum — oil, gas and natural gasoline plant products — individually for each and collectively for all.

The daily average production of oil — meaning crude oil and condensate separated on the lease — was approximately 6.27 million bbl, up almost 130 thousand B/D over the average for 1951, which was the highest to that time. Perhaps the daily average might have been higher still had not there been refinery and pipeline strikes in some parts of the country during the late spring. At the end of the year, the daily average production of oil was in excess of 6.5 million B/D.

In achieving this new annual record, the nation's production registered significant increases in Texas, California, Louisiana, Oklahoma, New Mexico, Illinois, Indiana and Colorado.

In Texas, which accounted for 45 per cent of the nation's oil production, the increase over 1951 resulted from higher production in West Texas and North Texas, together with a small increase in Southwest Texas. These increases more than offset cutbacks in production in the Gulf Coast and the East Texas areas. As the year ended, the daily production rate for the entire state was in excess of three million B/D.

California set a new record in producing almost a million B/D during the latter part of the year and averaged more than 980 thousand B/D over the entire year, which is in itself a record.

In Louisiana, the increase in production rate over that for 1951 was due to greater production from south Louisiana, which more than offset a small decline in the northern part of the state. Louisiana's production for the year has set a new record for that state.

It is interesting to note that 12 of the 27 oil producing states in the nation produced more oil in 1952 than in any previous year in history. Along with increases, however, were found some decreases in production from various states. Arkansas and Mississippi declined somewhat, as did, to a lesser extent, some other areas.

Firm figures on gas production are not available for all areas, since the estimation of total gas production is understandably difficult. The volume of gas marketed during 1952 was approximately eight trillion cu ft, as compared with about seven and one-half trillion cu ft for 1951. The volume of gas marketed, of course, is considerably less than the total volume produced from all sources.

In output of natural gasoline and cycling plant products, the record of over 600 thousand bbl of product per day established in 1952 constitutes an increase of about seven and one-half per cent over 1951's average.

HIGHLIGHTS

At this time last year, the topics which excited the most interest were new developments in the Rocky Mountain area and the status of the Spraberry trend of West Texas. As 1952 has passed, it has afforded a clearer picture of results in these areas.

Rocky Mountains

In the Rocky Mountain area, the number of wells drilled, the number of wildcats, and the production from the area tell only part of the story. Although these alone indicate a high level of activity, they are inadequate to reflect the optimistic attitude of more and bigger things to come which radiates from the entire area.

In the Williston Basin of North Dakota, which has probably received more publicity than any other part of the region, development continued to the Beaver Lodge area, discovered in 1951, and in the Tioga area, which is officially a 1952 discovery, though it was proved by tests made late in 1951. In addition to Tioga, three other areas along the Nesson anticline were proved during 1952 by production of oil from the Madison limestone.

Also in North Dakota, oil recovery has been reported from the Mississippian in the Turtle Mountain area of Bottineau County, just below the Canadian border. The Turtle Mountain area production is found at about 3,000 ft and has excited widespread interest. Indications of oil production have also been found in eastern Slope County.

To the southwestward of the center of the Williston Basin, the Baker-Glendive anticline in Montana was the scene of much drilling. The initial discovery in the trend, like that at Tioga, was tested during 1951 but not gauged officially until 1952. By the end of 1952, other nearby areas, also productive in the Devonian, had likewise been proved.

Following discovery of the first oil in the Charles of Mississippian age in 1951, two additional Charles discoveries were made in Montana in 1952. Production in the Powder River Basin was extended northward by discovery of oil in the Tensleep in the Snyder area of Roosevelt County. In central Montana, discovery of oil in the Sumatra area in the lower Amsden cause a renewal of interest in this portion of the state.

In Wyoming, there were discoveries in the Powder River Basin, the Wind River Basin, the Big Horn Basin, the Green River Basin, and in the extreme southwestern part of the state along the Denver-Julesburg trend.

The Denver-Julesburg Basin saw what was perhaps the greatest concentration of activity in the Rocky Mountain region. Some 35 new discoveries were made in this trend, of which 29 were oil and six were gas. The trend extends from an area east of Denver well into Nebraska. Production is from

sands of the Dakota-Lakota series in the Cretaceous. Moderate producing depths, of the order of 5,000 ft, and moderately easy drilling conditions encourage drilling in the trend. Much of the exploration has been done by independents. Some exploration was conducted during the year along the Las Animas arch which runs northeastward along the southeastern side of the basin. One gas discovery resulted.

A discovery of importance was made in Jackson County in the North Park Basin along the Coalmont anticline. This oil completion promises to kick off a renewal of interest in the western part of the state.

In the Uinta Basin of Utah there was some development drilling and three new discoveries were made, some of which were of doubtful importance.

Throughout the Rocky Mountain area, there has been a tremendous amount of geophysical prospecting. It has been estimated that almost a third of the geophysical crews working during 1952 were occupied in the Rocky Mountain area, including northwestern New Mexico.

One factor which has hindered production in the newer areas of the region has been lack of pipeline outlets. Pipeline recently completed, those under construction, and those still in the planning stage will do much to rectify the situation.

Spraberry

In reviewing the present status of those developments which appeared as the most interesting last year, we have seen that the Rocky Mountain region still looks bright after a year's time. The Spraberry is not a parallel.

In the beginning, the Spraberry was a sleeper. The industry was slow to realize the areal extent of the Spraberry trend. As exploration, development and production in the trend have progressed, the industry has realized that high well costs and lowered estimates of ultimate recovery do not permit development on the spacing that prevailed in initial development operations. Consequently, Spraberry activity has declined markedly. From a peak of about 240 rigs running in the trend during January, 1952, the number of rigs had declined to less than 40 at the end of the year. At the close of 1952 there was a total of approximately 2,280 wells producing from the Spraberry. The cumulative production to that time was an estimated 45 million bbl and the daily production was about 110,000 bbl. Roughly 435,000 acres, considered as proved or semi-proved, are embraced within the trend.

West Texas - New Mexico

In West Texas and southeastern New Mexico exploratory operations boomed during the year. Significant discoveries were made along the western side of the Midland Basin in the Devonian and in the Ellenburger. In New Mexico, some 21 wildcats were completed successfully in the Northwest Shelf area in Lea County in pre-Permian beds. Several discoveries were made in the same area in Permian or younger reservoirs.

The Delaware Basin received attention during the year. Several exploratory wells were being drilled to pre-Permian objectives as the year ended.

An important Texas discovery was reef production in Fisher County, to the northeast of the Midland Basin. Another reef discovery was made in Terry County, to the northward of the Midland Basin.

New Mexico was a beehive of activity all during the year. In the San Juan Basin some 405 wells were drilled, with eight completed as oil producers, 365 completed as gas wells, and 32 found to be dry. Only two of the producers could be classed as successful exploratory wells.

The year's most unusual discovery was the McCormick Ratliff No. 1 well in the Sunflower Sand Field of Texas which pumped 16 bbl of oil on a 10-hour gauge from a completion depth of 33 in., subsurface.

Other Areas in Texas

Although there were numerous discoveries in other parts of Texas during the year, interest in these has been partially overshadowed by preoccupation with operations in the western part of the state.

A discovery in the Texas Panhandle worthy of mention was that of high gravity oil production in dolomite in the western portion of the Anadarko Basin.

In East Texas, oil production was established on the southwest flank of the Carthage gas field. Previous oil production had been obtained only in a limited area in the southeast part of the field.

In the upper Gulf Coast most of the year's new discoveries were made in the Cockfield Wilcox trend, but probably most of the new reserves were found in the Frio sands. Cockfield discoveries included the South Hampton and Jackson and Doty Fields in Hardin County and the South Fairbanks Field in Harris County. In the category of Wilcox discoveries were Brown Lake Field in Montgomery County and New Ace in Polk County. Frio sand production was discovered in the Robinson Lake Field of Chambers County, the Galveston Field of Galveston County, the South San Jacinto Field of Harris County, and in new fault segments of the Danbury Field in Brazoria County. A prolific Frio Gas discovery was indicated in the Bronson Home Field of Wharton County.

Southwest Texas and South Central Texas accounted for a number of discoveries, most of which could not be called of signal importance. Worthy of mention among new fields found during the year are the Penescal Field and the adjoining Murdoch Pass Field in Kennedy County, both of which produce gas; the Ramirena oil field in Live Oak County, which produces from the Jackson-Yegua; several new gas fields producing from the Frio in Kennedy, Calhoun, San Patricio, and Aransas Counties; the Copano Bay discoveries of oil in new Frio pays in the West Fulton Beach Field; and the discovery of Wilcox oil in the Lopena Field underlying present productive zones.

Shallow Carrizo sand production was developed in several areas in Atascosa County.

Louisiana, Mississippi, Alabama, Florida

Louisiana enjoyed a profitable year from the standpoint of new discoveries. A record of 56 new pools were discovered, of which 30 were productive of oil and 26 of gas or condensate. Most of the new discoveries were in the southern part of the state. Some of the discoveries in south Louisiana which may prove to be of major importance are the South Pass, Magnolia, and East Black Bay Fields in Plaquemines Parish; Bourg, Four League Bay Pools in Terrebonne Parish; and the Cameron and Deep Lake Fields in Sameron Parish. Two new discoveries were made in the Wilcox trend extending through the central part of the state.

In north Louisiana, oil discoveries of interest were Ross Bayou, Concordia Parish; West Bryceland, Bienville Parish; Longstreet, De Soto Parish; Springhill, Webster Parish; and Summerfield in Claiborne Parish.

In Mississippi, Wilcox discoveries predominated. About a dozen new Wilcox producers resulted from exploration in Adams County alone. In the northeastern part of the state a significant discovery was made in the Mississippian. The discovery well produced gas and condensate in quantity, and served to focus interest on the area.

An important discovery in the southeastern part of the country was that of the Pollard Field in Alabama in Upper

Cretaceous-Lower Tuscaloosa sediments. Some 20 wells were producing from this area by the end of the year. Exploratory tests drilled in other parts of the Alabama-Georgia-Florida region were not successful.

Oklahoma, Kansas and Arkansas

Though most of the additions to reserves made by exploratory operations conducted in Oklahoma and Kansas were contributed by new small pools and extensions, some discoveries were significant. In the Oklahoma part of the Anadarko Basin deep oil or gas production was found in several areas, as well as shallower production from the Deese zone and granite wash. In the shallower portions of the basin east of the Hugoton gas field, new fields were proved in the Mississipian, Pennsylvanian, Marmaton and Lansing lime. Attention was given to exploring the Hugoton embayment of the basin in Kansas. The results are encouraging in that a number of pools have been found in the area. One development of interest was the discovery of the first oil within the area of the Hugoton Gas Field. The discovery well was completed in Marmaton lime.

Oil and gas production was established from the base of the Pnnsylvanian near the fault along the east side of the Oklahoma City Field. Also in Oklahoma, the McAlester Basin, in the southeastern part of the state, experienced renewed exploratory activity. In Southern Oklahoma, new gas production was found in a number of areas along the edge of the Anadarko Basin in the Springer sand.

In Kansas, numerous discoveries were made along the central Kansas uplift, as well as in the Hugoton embayment mentioned above.

New discoveries in Arkansas were, for the most part, centered in the southern part of the state. Although few of the 17 new pools uncovered in the southern part of the state may prove to be of major importance, the number of discoveries represents an increase over those of the previous year. Among the more prominent new pools and extensions are the Artesian Field of Calhoun County, producing heavy oil from the Meakin sand; the Springhill Field in Columbia County producing from the Tokio sand; the East Pace City Field in Onacita County producing from the Graves sand; the Calion Field of Union County, completed in Blossom and Graves sands; the South Hibank Field extension of Union County; the Schuler Field extension of Union County, a new producing horizon in the Tuscaloosa sand; and, in the same county, the Urbana-North Field, producing from the Travis Peak and Hosston formations.

Illinois Basin and Northeastern United States

Within the Illinois Basin, discoveries were, for the most part, relatively small. Some efforts were made to explore the edges of the basin for reef production. A wildcat drilled in the deepest part of the basin to the Shakapee lime failed to find production at bottom.

In Ohio, some new pools and extensions were proved during the year, and excitement was created by indications of a major Oriskany gas discovery. Later developments in the latter area belied the first reports.

Michigan saw the discovery of new and deeper oil and gas production from basal Salina-Miagara beds. Several wells drilled over an appreciable area were found productive. These discoveries are likely to result in an intensification of exploratory drilling in the area.

PACIFIC COAST

The year 1952 was not especially unique in the annals of the California petroleum industry. Production of crude oil continued to rise, the average rate of production was higher, and the total oil produced was greater than during the previous year. Discoveries of new oil and gas pools continued at about the same rate and order of magnitude. There were no great finds, but reserves were materially increased by the discovery of a number of smaller accumulations. Both civilian and military demand for crude oil and its products continued at a high level throughout the year. A small amount of crude oil was run to storage during 1952. However, resultant increases in stocks may be charged to technical adjustment based upon seasonal changes in products demands, rather than overproduction and a softening market.

Future outlook for California appears optimistic in the continued development of known accumulations and for discovery of additional reserves. Eocene production within the environs of the southern end of the San Joaquin Valley gives promise. The heavy oil reserves of the Pliocene and Miocene of the Salinas Valley and Santa Maria districts may be augmented with additional discoveries, and the possibilities of coastal tidelands and off-shore development of the Santa Barbara channel may be the answer to depleting reserves.

While petroleum reserves are getting harder and costlier to find on the Pacific Coast, California's outlook is still very promising. With proper price structure, less government interference, solution of the tidelands controversy, and opening them to exploration and development, oil companies will be in a position to keep this state in the position it has always had as a top crude oil producer.

Washington, Oregon, Nevada and Arizona, together with California, make up the Pacific Coast states. Exploration of the most favorable areas for petroleum accumulation in these states continued throughout the year. However, outside of California, developments of the past year and future expectations were not encouraging.

With the announcement by at least two major oil companies that large capacity petroleum refineries will be built in the state of Washington to process Canadian crude, some shrinkage in the demand for California crude may be felt when these become a reality.

CALIFORNIA

Crude Oil Production

Production of crude oil in California during 1952 ranged from 971,758 B/D in January, to 992,744 B/D in December, and averaged 982,102 B/D for an all-time high of 359,449,510 total bbl. This compares with a total of 354,561,401 bbl in 1951 for an increase of 1.4 per cent.

The average trend in the rate of production was one of gradual increase throughout the year, culminating in a peak of 992,744 B/D in December, 1952. Assuming a continuance in the production trend, California will shortly produce above one million B/D. This would be certain if the production rate of Elk Hills is stepped up. If opened up completely, this field could probably account for at least 100,000 B/D additional crude oil.

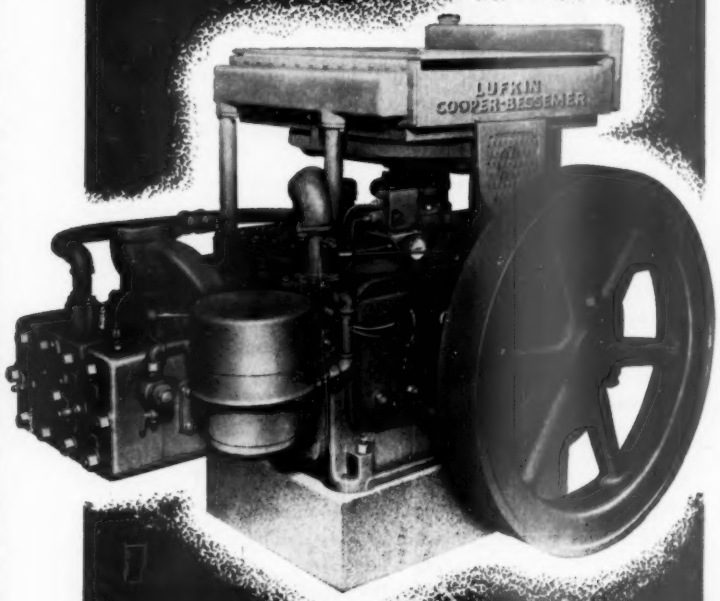
Produced oil field gas held reasonably constant during the year, at an average of 46,510 MMcf per month, although injected gas used in repressuring and pressure maintenance dropped off to some extent during the last six months of the year. Gas from dry gas fields was on a seasonal withdrawal basis as usual.

Development and Drilling

During the year, 1,977 oil wells and 35 gas wells were successfully completed, while 692 were unsuccessful and were abandoned. This is a total of 2,704 wells drilled for gas and

Continued on Page 5, Section 2

Lufkin



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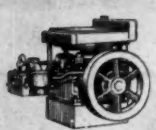
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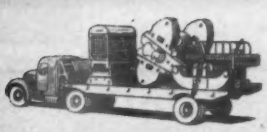
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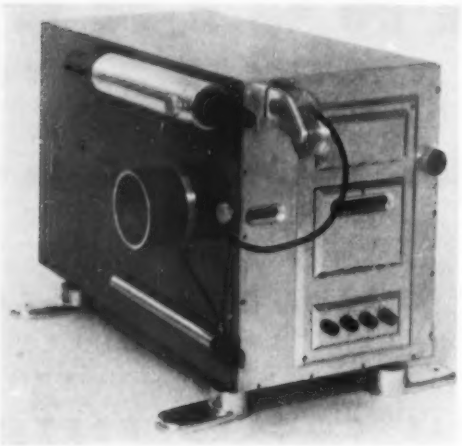

Check these advantages offered by the Geo-Logger

- **PORTABLE** — The Geo-Logger is small enough to fit into the trunk of a passenger car. Users have logged millions of feet of hole without the requirement of an additional vehicle.

- **SIMPLE** — The Geo-Logger is being operated successfully in the field by unskilled men who have no technical knowledge of electric logging. Clear and readable instructions make it possible for any driller or truck driver to log a hole.

- **ACCURATE** — Instantaneous photographic recording insures identical character and correlation with logs from standard truck-type logging units. In many cases the portable Geo-Logger has supplanted the need for this expensive service.

- **DURABLE** — Experience has proven that the Geo-Logger is relatively trouble free and easy to maintain in the field. In addition major parts are carefully engineered for quick interchangeability. Technicians are readily available for service.

- **ECONOMICAL** — Because of the Geo-Logger's inherent accuracy and portability operators can now log holes that would otherwise be prohibitive due to cost or inaccessibility. Easy set-up and fast recording make it possible to log several thousand feet of hole each day.

- **VERSATILE** — The varied operations which have found a continuing use for the Geo-Logger include core drilling, seismograph surveys, water flood operations, water well drilling and surface mining as well as oil and gas production. Technical aid is available to adapt the Geo-Logger to any well logging requirement.

DESCRIPTIVE DATA

SIZE — 16 in. wide by 26½ in. deep and 16¾ in. high.

WEIGHT — Approximately 200 lbs., exclusive of external power source.

LOG — A Self Potential and a Resistivity curve are recorded simultaneously on rectilinear paper 3 in. wide. The log is provided with scales of either 50 ft. or 20 ft. to the inch, on opaque or translucent paper or on film. All are suitable for reproduction.

RECORDER — A unique type of instantaneous photographic recording is employed to give a developed log as the plummet is withdrawn from the hole. This log can, of course, be observed both going in and coming out of the hole.

PLUMMET — 18 in. long by 1¾ in. in diameter, weight 20 lbs. It may be made as small as ⅞ of an inch in diameter.

SENSITIVITIES — A wide range of sensitivities is provided, including a maximum of 1 ohm per scale division on the resistivity side and 5 millivolts on the self potential side.

CABLE — Double steel — armored, copper conductor cable. Wt.: 17 lbs. per 1000 ft. Breaking stress: over 1500 lbs.

HOIST — The reel is powered by a ⅓ h.p. electric motor. It is capable of a range of speeds up to 7200 ft. per hour.

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CANADA - A Review of 1952 Production

By E. W. Shaw
Imperial Oil Limited

Canada is finding new markets, and the means of getting its increased production to them, for its ever-expanding petroleum industry. A "pattern of maturity" characterized the activities of the industry during 1952.

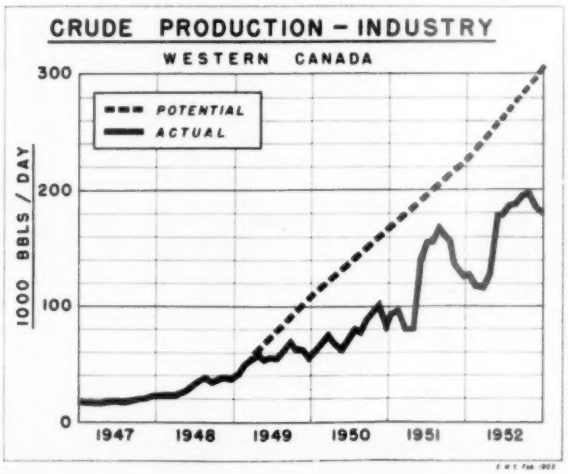
WESTERN CANADA

Greatly increased activity and a pattern of maturity characterized Western Canadian production and exploration for 1952.

Activity was stimulated by a variety of events. New prospective markets for crude oil and natural gas were indicated for the near future by plans for additional pipeline facilities. Trans Mountain Oil Pipe Line Co. started a 24-in. crude oil line from Edmonton, Alberta, across the Canadian Rockies to Vancouver, a distance of 695 miles. The line will have an initial capacity of 120,000 B/D with three pumping stations and a capacity of 200,000 B/D with two additional pumping stations. Completion of the line is forecast for autumn of 1953.

Late in the year, a major extension of the Inter-provincial pipeline was announced. The line, now reaching from central Alberta to Superior, Wis., will be extended through northern Michigan to Sarnia in order to provide year round delivery of western oil to Ontario. The extension will be 625 miles in length of 30-in. pipe and should be completed early in 1954. The overall length will be 1,751 miles with an ultimate capacity in the order of 300,000 B/D.

In addition to these two crude oil lines, the construction of natural gas pipelines to both east and west awaits only certain governmental approvals. Westcoast Transmission Co. has Canadian federal approval for its projected line from the Peace River area of northeastern British Columbia across the Rockies to Vancouver, and awaits U. S. Federal Power Commission approval for extension of this projected line into northwestern United States. Competition is keen for the construction of a natural gas pipeline east from Western Canada and action on such a line mainly awaits provincial government approval for export from central and southern Alberta.



But more important as a stimulant to the industry was the continuation of good exploration results. Discoveries were made more frequently than ever before and reserves increased by a steepening curve. And finally, with an impressive number of medium gravity oil discoveries in southern Saskatchewan, came final proof of the prospectiveness of all major parts of the Western Canada sedimentary area.

The maturity of the industry in Western Canada became increasingly more evident. A wide range of oil field and exploration services were already established. During the year, a salt water disposal company was formed and put into operation by the producers of the Redwater Field. A gas injection plant is under construction at the Golden Spike Field. The gas conservation plant in the Leduc Field was expanded during the year so as to increase capacity from 18 MMcf/D to 24 MMcf/D. In the outskirts of the city of Edmonton, Canadian Industries, Ltd., has under construction a plant designed to produce Polythene from Leduc-Woodbend residue gas and Canadian Chemical, a subsidiary of American Celanese, has a large acetate plant under construction. In southern Alberta, Shell added a sulphur extraction unit to its gas plant at the Jumping Pound gas field and Royalite added a similar unit to its gas plant in Turner Valley.

Production

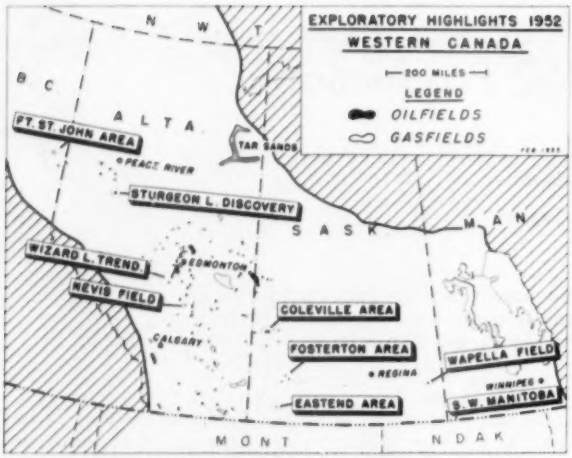
Crude oil production in Western Canada was about 61 million bbl for an average of about 166,000 B/D, which is an increase of 28 per cent over 1951. The disposition of this production was: Prairies 64 per cent, Eastern Canada 33 per cent, West Coast 0.6 per cent and north central United States 2.4 per cent.

Development drilling in Western Canada increased by 54 per cent over 1951 for a total of 1,393 wells. The most active areas were the Joseph Lake-Camrose trend, the Wizard Lake trend and the Leduc area of central Alberta, and the Coleville and Fosterton areas of western Saskatchewan.

As previously stated, oil reserves increased by a steepening curve, climbing from 1.33 billion bbl at the close of 1951 to 1.92 billion bbl at the end of 1952, an increase of 0.59 billion bbl.

Exploration

Total acre under reservation, lease and option in Western Canada increased by 24 per cent from 168 million acres to about 208.5 million acres during the year. The big land plays in northeastern British Columbia and Northwest Territories which began in 1951 spread northward to within 175 miles of



the Arctic Circle and westward into the Yukon. Another land play ran its course in the foothills of Alberta and British Columbia, a geological province that has been comparatively inactive since 1947 due to exploratory preoccupation on the plains after the discovery of the Leduc Field.

A feature of the year was the renewal of activity in the famous Athabaska tar sands area. Several of the special 50,000-acre permits were issued by the Alberta government and core drilling was commenced on some of these for the purpose of delineating areas of high bitumen concentration.

In the areas of more advanced exploration, the land play was characterized by prices that were generally high, and in some cases spectacular, and by the number of deals whereby various operators sought to increase or dilute their interests depending on their financial means or geological ratings. The high land prices of the Edmonton area spread throughout southern Saskatchewan as this northern part of the Williston Basin began to register important discoveries.

Surveys showed strong gains during 1952. All the usual methods were in use but by far the greatest activity was with the reflection seismograph. Seismic crew level reached a high of 167 as compared to 140 in 1951. The most conspicuous gain was in southern Saskatchewan but the greatest concentration was still in south central Alberta. The greatest ingenuity was required in northern Alberta and adjacent parts of British Columbia and Northwest Territories where various tracked vehicles were improvised or adapted to operate throughout the year in the large areas of forest and muskeg. Crews were serviced mainly by plane and helicopter.

The most phenomenal increase during 1952 was in exploratory drilling. A total of 836 exploratory wells were drilled compared to 480 in 1951, an increase of 74 per cent. The greatest increase was in Saskatchewan where 220 wells were drilled for a 233 per cent gain.

Discoveries during 1952 were impressive in number and in importance: 119 oil discoveries and 92 gas discoveries for a total of 211 were indicated during the year.* Thus a discovery ratio of one oil or gas discovery per four wildcats is indicated. Brief comments on the discovery highlights, however, may be more significant.

Once again, the year's most important oil and gas discovery was in the Edmonton area of central Alberta when the Bonnie Glen Field some 35 miles southwest of Edmonton and six miles south-southwest of the big Wizard Lake discovery of 1951, was brought in by The Texas Co. The discovery well has an oil column of about 300 ft and a gas cap of about 400 ft in a Leduc (D-3) reef of the Upper Devonian. The total oil and gas column of about 700 ft in a single reservoir is a new Canadian record. As presently developed, the field is about four miles long and averages about one mile wide. On the same trend, but six miles farther to the south-southwest, the Fivelands Field was discovered with an oil column of about 240 ft and a gas cap of about 250 ft in another Leduc (D-3) reef. Midway between Bonnie Glen and Fivelands, the Pigeon Lake discovery was made in still another D-3 reef but this discovery was relatively disappointing with a negligible oil column and a 150-ft gas cap.

The second most significant discovery in central Alberta during 1952 was, perhaps, the Nevis wet gas field.* This occurrence is in the Upper Devonian where the D-2 and D-3 zones appear to have coalesced into a single reservoir with a large wet gas cap and a negligible oil column. The discovery is particularly important because it should provide the additional gas reserve necessary to justify gas export from the central and southern parts of the Province of Alberta.

Two important discoveries were made in the Peace River district of northern Alberta and northeastern British Columbia. A large gas reserve was indicated in the Fort St. John area of northeastern British Columbia by Pacific Petroleums and Associates. Gas and minor amounts of oil occur in the Lower Cretaceous, Triassic, and the Permo-Pennsylvanian in 12 zones. Hume and Ignatieff** of the Federal Government have estimated proven and probable reserves at 1,446 MMMcf. Generally, the various zones are characterized by rather local permeability, and therefore reserve estimates are difficult to make at the present stage of development. The structure is large, however, and potentially important. The discovery is of great significance with respect to the supply of gas for the Vancouver area and northwestern United States.

The second important discovery in the Peace River area was made by Amerada at Sturgeon Lake, 75 miles south of Peace River town in northern Alberta. The discovery well found 85 ft of oil column in a Leduc D-3 reef of the Upper Devonian. The field has not been delimited and therefore its size is unknown but at any rate the discovery provides further proof of the continuance of Upper Devonian reef occurrences into northern Alberta.

One of the most significant features of the 1952 exploratory year was the important discoveries of medium and heavy gravity oils in southern Saskatchewan and the continuance of light oil discoveries in the Mississippian of southwestern Manitoba. All of these discoveries may be regarded as being located around the northern rim of the Williston Basin. The medium gravity oil discoveries were mostly in the Jurassic, but some of the occurrences are in contiguous sands of the Lower Cretaceous. An important group of fields consisting of Fosterton, Midway, Cantuar, and Success was discovered by Socony in the general Swift Current area of southwestern Saskatchewan. For the most part, the oil is contained in a local sand of the Swift formation of upper Jurassic age. Structural control is a combination of an erosional pinchout and minor diastrophic uplifts. Some 50 miles to the south, other Jurassic discoveries of medium gravity oil and gas were made. Notable among these is the Eastend Field discovered by Tide Water and Associates. The productive zone is a sandy, oolitic limestone of the Rierdon formation. Structural control appears to have resulted from small diastrophic uplifts.

Continued on Page 10, Section 2

*These numbers refer to total indicated and actual discoveries from all exploratory well categories of the Lahee classification.

*Discovered by Gulf.

**Hume, G. S., and Ignatieff, A.: Natural Gas Reserves of the Peace River Area, British Columbia and Alberta, Department of Mines and Technical Surveys, Ottawa, (Sept. 1952).

SOUTH AMERICA - A Review of 1952 Production

By DeGolyer and MacNaughton, Inc.

Venezuela retains its position as the No. 2 petroleum producing country of the world, and interests focus on other South American countries as exploration activities are on the increase in spite of legal difficulties.

Argentina

Accurate information from Argentina is unobtainable since the government does not release any information on petroleum developments in the country.

Most of the production is obtained from three fields: Comodoro Rivadavia, Nequen and Mendoza. Daily production is being increased gradually by exploitation drilling. The daily average was about 66,870 bbl in 1952. Some exploration drilling is being done in the northern part of the country but the results are not known. Apparently no important discoveries have been made. The latest estimate of the remaining reserves is approximately 300,000,000 bbl.

Early in 1952, The Texas Co. and the Socony Vacuum Oil Co. sold their jointly-owned 6,000 bbl refinery to the government in a forced sale. Governmental currency restrictions had made it impossible for the companies to obtain crude for the refinery. Total refinery capacity of the country is approximately 213,000 B/D.

Chile

All of Chile's production comes from the Springhill and associated fields in Tierra del Fuego. The accumulation is in anticlinal folds and the producing sands are Cretaceous in age. Some of the structures contain only gas.

Production in 1952 was at a daily rate of 2,500 bbl and several of the wells were shut in awaiting the completion of repressuring facilities in the field. The remaining reserves are estimated at 30,000,000 bbl.

The existing refinery capacity is about 6,300 B/D. A loan of $2,000,000 has been negotiated with a U. S. bank for the construction of a 20,000 B/D refinery to be located just outside of the city of Valparaiso.

Colombia

Petroleum production in Colombia averaged 105,495 B/D of oil and 2,338 B/D of condensate in 1952. These figures indicate a very slight increase over the figures for 1951. The remaining reserves of the country are estimated at 450,000,000 bbl.

The refining capacity of the country is about 37,000 B/D. However, this will be increased when the refinery at Barranca-Bermeja is modernized and enlarged.

As a result of the liberalization of the Colombian petroleum law there has been a considerable increase in leasing activities by the operating companies. This is expected to be reflected by an increase in exploratory drilling in the future. At the beginning of the year there were 15 active drilling rigs operating in Colombia. This number was increased to 17 at the middle of the year. Most of the drilling was confined to proven areas, however, and no important new discoveries were made during the year.

Bolivia

Essentially all of Bolivia's production comes from three fields — Camiri, Bermejo and Sandinita, in the eastern part of the country. Total production in 1952 averaged a little less than 1,500 B/D as compared with approximately 3,000 B/D needed to supply the domestic market. The Bermejo Field is a continuation of the Agua Blanca Field of Argentina and the production from Bolivia's portion of the structure is sold to Argentina.

There were three rotary and two cable tool rigs operating in the country during the year. Drilling was confined to proven areas. The remaining reserves of the country are estimated at 21,500,000 bbl.

Production and refining of oil in Bolivia is controlled by the government agency, Y.P.F.B. In 1951 a new petroleum law went into effect relaxing some of the restrictions of the previous law against foreign participation in the oil industry. However, foreign interests have not shown much interest in reentering the country. This is partly because of certain objectionable provisions of the present law, but mostly because of the risk of another expropriation.

Ecuador

Ecuador's production is obtained from five principal fields, Ancson, Carolina-Santa Paula, Concepcion, Petropolis and Tigre Cantivo. The daily average during 1952 from these fields was around 7,700 bbl, an increase of about 300 bbl over the figure for the previous year. All of the producing fields are located on the Santa Elena peninsula but some exploratory work is being done in other parts of the country. The remaining reserves are estimated at about 30,000,000 bbl.

Most of the oil produced is used in the country but there is a small exportable surplus. The total refinery capacity of the country is around 11,800 B/D.

Peru

A land leasing boom developed in Peru in the latter part of the year as a result of the liberalizing of the country's petroleum law. Seventeen companies submitted bids on exploration tracts totaling more than three and one-half million hectares. The new law divides the country into four divisions with differing tax and rental provisions, but, in general, the law is patterned after that of Venezuela.

Daily production averaged about 44,700 bbl of oil and 3,000 bbl of condensate. The remaining reserves of the country are estimated at 170,000,000 bl.

The total refinery capacity in the country amounts to about 38,000 B/D.

Uruguay*

With the close collaboration of the Institute Geologico del Uruguay and the technical assistance of DeGolyer and Mac-

*Presented with permission of the Board of Directors of Ancap.

Naughton, Inc., the Administracion Nacional de Combustibles, Alcohol y Portland (ANCAP) continued its planned program of field studies and research aimed at the clarification of conditions governing the occurrence of oil in Uruguay.

During 1952 considerable progress was made in completing the reconnaissance geophysical studies of the basalt-covered sedimentary basin of northwest Uruguay. Almost the entire area included in the Departments of Artigas and Salto has now been completed. In addition, detailed gravity-magnetic surveys were carried out, near Itapebi, Salto, over an area comprising about 1,000 square kilometers and located northwest of the city of Salto.

In conjunction with other studies, stratigraphic test drilling has been carried out by the Instituto Geologico near Artigas in northwest Uruguay; in the Laguna Merin basin of eastern Uruguay; in the San Jacinto area of southern Uruguay; and northwest of Tacuarembo, near the border of the basalt-covered area. The last-mentioned test well is one of several to be drilled for the purpose of compiling factual geological data to be used in the interpretation of geophysical results. It is hoped that in the near future a clearer understanding of geophysical-geological relationships will be possible as a result of the test drilling.

At this time the Ancap also has underway certain preliminary technical and financial studies relative to the acquisition of exploration drilling equipment.

This past year much progress has been made by the Ancap in the exchange of technical, scientific and financial information on the various aspects of oil finding with corresponding organizations in Chile and Brazil.

All in all, it has been a very successful year and definite progress toward a solution of Uruguay's oil exploration problems has been made.

Brazil

The Conselho Nacional de Petroleo set new records in the amount of petroleum produced, the total meterage drilled and the amount of geological and geophysical exploration completed for the year 1952.

Production of crude oil exceeded 750,000 bbl for the year. A six-in. pipeline was completed from the Dom Joao Field to the Mataripe refinery in Bahia. A four-in. gas line from the Aratu Gas Field to the Candeias Field was nearing completion at the end of the year. The projected expansion of the Mataripe refinery from 2,500 B/D to 5,000 B/D made considerable progress during 1952. It is anticipated that the expansion program will be completed about mid-1953.

A total of 59 wells were drilled by the Conselho during 1952. Of these 44 were oil wells, two were gas wells and 13 were dry. A total of 31,134 meters were drilled which exceeds all previous annual drilling records in Brazil.

An extensive program of geological and geophysical exploration was carried out in Brazil throughout 1952. Seismograph parties were operating in the sedimentary basins of Amazonas, Para, Maranhao and Bahia. Geological field parties worked in Maranhao, Bahia, Sao Paulo, Parana and Santa Catarina. An experimental airborne mgnetometer survey was conducted in Sao Paulo.

Present plans call for an expansion of the entire petroleum exploration and development program in Brazil during 1953.

Venezuela

During 1952 Venezuela produced a total of approximately 656 million bbl of crude oil, a daily average of about 1,797,450 bbl, thereby retaining second place among the oil producing countries of the world. During the first half of the year production was at a somewhat higher rate and averaged slightly more than 1,823,000 B/D. Total production for 1952 was approximately 5.3 per cent greater than during 1951.

During the year approximately 1,285 wells were drilled of which about 1,130 were completed as producers; total footage drilled amounted to roughly 6,197,500 ft. On the basis of ratios for the first eight months of the year, 75.7 per cent of the wells drilled were for development, 19.35 per cent were classed as semi-exploratory, and 4.95 per cent as exploratory wells. The number of drilling rigs in operation varied from 106 at the beginning of the year to a high of 124 near the middle of the year and 122 rigs were operating in December.

Relatively few data are yet available for judging the results of exploratory drilling; there apparently were no large new discoveries. The relatively large percentage of semi-exploratory wells indicates that exploratory drilling was mainly confined to areas that are now producing. During several months of the year the number of geological and geophysical parties in operation was slightly in excess of the number employed during 1951, but in general the number of such crews employed during the year was about the same as in the preceding year. All types of exploratory activity were confined to concessions acquired by the companies during or prior to 1945, the last year in which new concessions were granted. Marine seismic surveys were conducted in the Gulf of Venezuela and in the Gulf of Paria for the joint account of several companies. One company has been granted permission to drill in the Gulf of Paria.

Data for the first nine months of 1952 indicate that a total of 127,397,000 bbl of crude oil was refined in Venezuela during the year, or about 19.5 per cent of total oil produced. Plans are underway for increasing capacities of the principal refineries so the percentage of Venezuelan oil refined in the country will be substantially increased during 1953.

A new oil pipeline from the fields west of Maracaibo to the Paraguaná Peninsula was put into operation in March. This line is 30 in. in diameter and 170 miles in length; there are two submarine sections each slightly more than 10 miles long. The line has an initial capacity of 225,000 B/D. It is owned principally by Shell Oil Co. with The Texas Co. and Mene Grande Oil Co. owning minor interests. During May work was begun on a 26-in. oil pipeline that will parallel Creole's existing line from the Bolivia Coastal Fields to Amuay refinery on the Paraguaná Peninsula. It will have a length of 150 miles and the estimated cost is $20 million. The looped line will have a daily capacity of 481,000 bbl.

In May Vatcorp began delivering gas through its 16 to $10\frac{3}{4}$-in. gas transmission line that extends from the oil and gas fields in the state of Guarico to Caracas and nearby towns. The main line is 190 miles in length and has design capacity of 70 million cu ft per day. The company has been authorized to charge $0.388 per Mcf for gas sold at La Guira, with slightly higher or lower rates for towns that are, respectively, farther from or closer to the source.

An important project started in 1952 is the dredging of the bar at the mouth of Lake Maracaibo, which in the past has caused the companies to use shallow-draft tankers for moving crude oil from the Bolivar Coastal Fields to transshipping points on the Paraguaná Peninsula and to refineries in the Dutch West Indies. The estimated cost of the dredging is $40 million and four years will be required to complete the work, but it is expected that ships with a draft of 34 ft will be able to enter the lake after two and one-half years. It is estimated that maintenance of the channel will cost approximately one million dollars per year. The project is being financed mainly by advances from the oil companies, which will be repaid by reduced tolls.

Another dredging operation that will yield direct or indirect advantages for the oil companies is that in the Orinoco River which will enable iron ore ships as well as other types, to go 125 miles upstream from the mouth of the river.

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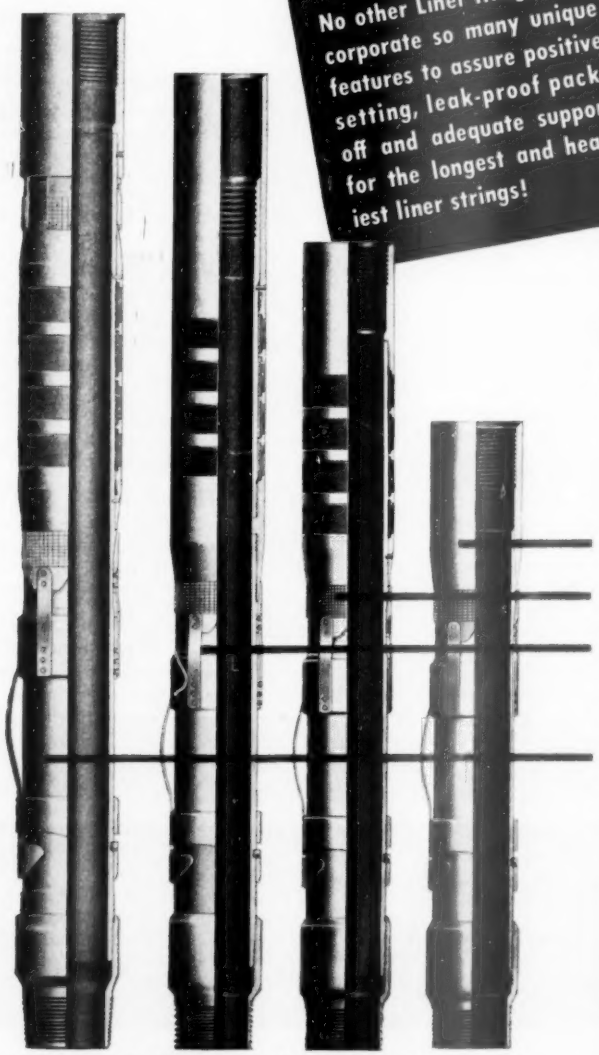

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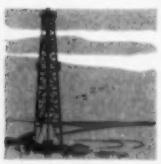

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MIDDLE EAST - A Review of 1952 Production

By A. H. Chapman
Arabian American Oil Co.

Political upheaval persisted in Iran throughout 1952 adversely affecting production and development. The Iraqi Government demanded increased production. The region as a whole increased production by 7 per cent.

Production activities in the Middle East during 1952 were strongly influenced by political developments. Among these developments were the continued shutdown of the industry in Iran, and the demands by the Government of Iraq that production be increased so that Iraq may take her place among the leading producers in the area. All of the concessionarie countries have now completed renegotiation of contracts whereby they sare equally in the profits of petroleum operations. The governments of these countries therefore become even more actively interested in the establishment of markets for their output, in the maintenance of high rates of production, and to see that the oil is sold at fair market prices.

All of these factors have a direct influence on their national income, a very large percentage of which is derived from the industry. Significant results of these developments have been, first, an increase in production rates during 1951 caused by the withdrawal of the Iranian output, which increase has been disproportionate to the growth of the tributary markets. The second result has been a very large increase in the production of Iraq during 1952 which resulted from the completion of additional pipeline facilities. The markets for Iraqi oil, thus expanded, reduced somewhat in 1952 the rate of growth in the production output of some of the other countries of the Middle East.

The production of the countries of the Middle East for 1952 (as well as for a number of other years between 1938 and 1951) is shown in Table 1. The 1952 production of the Middle East amounted to 2,045,000 B/D as compared to 1,902,000 B/D for 1951. This represents an increase of about seven per cent over 1951. Previous annual increases have ranged between eight and 20 per cent.

A compilation of world crude oil reserves appears in Table 2. Crude oil reserves at the beginning of 1953 in the Middle East amounted to 64.8 billion bbl. With a free world total of 108.6 billion bbl, the Middle East, therefore, contains 60 per cent of the free world's known oil. In the Middle East, the principal increases in reserves in 1952 occurred in Kuwait where the reserve figure advanced from 15 to 20 billion bbl, and in Saudi Arabia where an increase from 12 to 16 billion bbl was registered. At the end of World War II (1945) Middle East reserves totalled 15.7 billion bbl. The past eight years, therefore, has seen an increase of reserves of 1,400 per cent. The greatest increase in any single year was registered in 1952 when some 11,300,000,000 bbl of new oil (plus annual production) were developed.

IRAQ

Iraq Petroleum Co., Ltd.

In April, 1952, the 55-mile 30 - 32-in. pipeline from Kirkuk to Banias was completed. This enabled the 1952 production of oil from Kirkuk to be doubled as compared with 1951. The total for 1952 was 15.5 million tons or 322,000 B/D. Two rigs were employed at Kirkuk and one exploitation well was drilled. Three exploration wells and one exploitation well were in progress at the end of the year.

In February, 1952, the agreement providing for the equal sharing of the profits between the Iraq Government and the Iraq Petroleum group of companies was ratified by both houses of the Iraq Parliament. The agreement became effective from Jan. 1, 1951.

In November, the 30-in. pipeline to the port of Banias on the Mediterranean was officially inaugurated by King Faisal II at Kirkuk and by the Prime Minister of Syria at Banias.

This pipeline extends from Kirkuk to Banias and was completed early in the year with the first tank loading in mid-April. Initial capacity of this new line is stated to be 280,000 B/D, giving a total pipeline capacity from Iraq to the eastern Mediterranean of 440,000 B/D.

Mosul Petroleum Co., Ltd.

At Ain Zalah, two rigs were employed during the year, one exploitation well was completed and one exploration well was in progress at the end of the year.

A 12-in., 134-mile pipeline from Ain Zalah to K.2 Pump Station was completed towards the end of the year. This pipeline joins the main pipeline system from Kirkuk to the Mediterranean at station K.2 and has a capacity of about 20,000 B/D. In the last three months of 1952 just over a quarter of a million tons of oil or 20,190 B/D were exported.

Basrah Petroleum Co., Ltd.

The Zubair Field of the Basrah Petroleum Co. began to export crude by the end of December, 1951, and by 1952 over two and a quarter million tons of oil or 46,350 B/D were exported from the terminal at Fao.

Five rigs were employed and during the year nine exploitation wells were completed. One exploration and six exploitation wells were in progress at the end of the year.

In January, the Prime Minister of Iraq, Nuri Pasha El-Said, performed the ceremony inaugurating the Zubair Field. At present, the production of the Zubair Field is pumped to the Persian Gulf port of Fao through a 12-in. pipeline. However, work has been started on a new 24-in. pipeline which will increase the capacity to Fao by 160,000 B/D. As a result of the increased pipeline capacity, crude oil production in Iraq increased from 179,000 B/D in January to 475,000 B/D in October.

KUWAIT

Initial production was obtained from Kuwait in 1946. In 1948 the average for the year amounted to 127,000 B/D. Over the five-year period (1948-1952) the productivity of this area has multiplied sixfold.

The Kuwait Oil Co., Ltd., had three drilling rigs active in Kuwait throughout 1952. These three rigs completed two new-field wildcat wells, seven extension wells and 12 development wells during the year. There were no dry holes. A fourth rig worked part of the year on well service jobs.

The Magwa — one wildcat drilled during 1951 some eight miles north of Burgan Field was completed early in 1952 as a producer. This discovery in Magwa was followed by a step-out drilling program and at year's end the Magwa area had eight completions. At that time all three drilling rigs were active in Magwa.

The second new-field wildcat mentioned above was spudded in August, 1952, on the Ahmadi Ridge structure just south of the Kuwait Oil Co.'s camp and tank farm. This well was four and three-tenths' miles northeast of Burgan Field and was named Ahmadi-1. This well reached final depth of 5,349 ft late in October and was subsequently completed as a satisfactory potential producer.

Kuwait production during the year came almost entirely from Burgan Field in which 131 wells have now been drilled. Production rates for the year as a whole averaged slightly less than 750,000 B/D.

During the year, gathering center capacity serving Burgan Field was increased to a normal working capacity of 900,000 B/D. Furthermore, installation work on the initial gathering center for Magwa Field was almost completed, and this second field should go on production in the very near future.

Oil storage capacity and loading capacity in Kuwait were both increased in order to keep up with field offtake requirements, and for reasons of good production practice. Working storage in the Mina al Ahmadi tank farm now totals about three million bbl. The Kuwait Oil Co. loading dock at Mina al Ahmadi has six oil berths plus two additional berths, normally used for incoming cargo but which can be used for oil loading if necessary. In addition, there is one submarine loading line for crude oil and a second submarine loading line for handling refined products.

Kuwait-Saudi Arab Neutral Zone

The concession over all of this area is held by the American Independent Oil Co. and Pacific Western interests. During 1952 a considerable amount of geological and geophysical surveys was carried out and one well was drilled which turned out to be a dry hole. This makes a total of five unsuccessful wells which have been drilled by the company in this area. It is understood that Aminco intends to continue with a further program of exploratory drilling.

Table 1 — Middle East Crude Oil Production

	1938	1939	1948	1949	1950	1951	1952
Bahrain	23	21	30	30	30	30	30
Iran	215	214	517	562	665	333	....
Iraq	89	84	64	79	128	167	374
Kuwait	....	....	127	246	344	561	747
Qatar	....	....	....	2	33	49	69
Saudi Arabia	1	11	390	477	547	762	825
Middle East Total	328	330	1,128	1,396	1,747	1,902	2,045

Note: No production included for Iran after August, 1951.

QATAR

Petroleum Development (Qatar), Ltd.

During the year an agreement was signed providing for the equal sharing of the profits accruing from operations in Qatar between the company and the Shaikh of Qatar which became effective from Sept. 1, 1952. Two rigs were employed and eight exploitation wells and one exploration well were completed. At the end of the year one exploration and one exploitation well were in progress. Average production for the year amounted to 69,000 B/D.

SYRIA, LEBANON AND TRANSJORDAN

There were no producing activities in these countries during 1952 with the exception of Lebanon where it is understood that the Wrightsman - Pacific-Western companies have obtained a right to drill a test well in the Stura Valley of Lebanon. All of these countries, however, are associated with petroleum activity because of the network of pipelines which crosses their borders and the activities in the terminal areas of Sidon and Tripoli in Lebanon and Banias in Syria. All of these terminals were in full operation during the year and at current rates are loading out about 650,000 B/D.

BAHRAIN

Production at Bahrain continues at 30,000 B/D.

Six wells were drilled to the Bahrain Zone (1,800-2,500 ft) of the Bahrain Field in 1952. One of these was a gas injection well to the Linestone producing member, bringing the total number of gas injection wells to four. The rate of gas injection is being stepped up to 17,500,000 cu ft per day. Gas, of course, is being supplied without compression from the high pressure gas zones of the Arab Zone, equivalent to Bahrain's Fourth Pay. Three of the six wells were drilled as replacements to wells abandoned or captured by gas and two were drilled in the Southern Extension. Exploratory drilling here has found no separate closure but merely that the productive area of the first pays extends for a considerable distance southerly of the productive limit of the principal producing members of the Bahrain Zone.

Plans for the immediate future are to continue drilling the relatively few exploitation wells necessitated for replacement and to improve the drainage pattern.

SAUDI ARABIA

Arabian American Oil Co.

Production in Saudi Arabia during 1952 averaged 824,756 B/D. The trend of production throughout the year was quite stable, with a slight falling off during the last three months of the year. Of this total, the averages for the four areas were approximately as follows:

	B/D	Percentage
Abqaiq	422,000	51
Dammam	63,000	8
Ghawar-Ain Dar	305,000	37
Qatif	35,000	4

During the year, 40 new oil wells were completed, and were located in the following fields: Ghawar, Ain Dar, 17; Ghawar Shedgum, 2; Ghawar 'Uthmaniya, 15; and Safaniya, 6. The

number of wells completed by the end of 1952 totalled 214. Of these 129 were producing oil wells. At the end of 1952, seven drilling rigs were in operation. Commencing in January, 1953, this number was reduced to six. The disposition of production was approximately as follows:

	B/D	Percentage
Crude oil pumped to Bahrein	130,171	16
Crude oil offloaded at Ras Tanura	208,977	25
Crude oil pumped to Tapline	309,274	38
Crude oil runs to stills	169,957	20
Crude oil used, sold and in closing inventory	6,377	1

During 1952, Aramco was very active in the field of exploration surveys, mapping parties operated in northern Hasa and in the northwestern part of the concession; also in northern Hasa there was a triangulation party, two structure parties and a gravity meter party. In the vast sand area to the south, called the Rub'al Khali, there was a triangulation party, two gravity meter parties and a structure drill party.

A large number of major facilities were completed and put into operation during 1952. Among these were five new gas-oil separator plants, a 30-31-in. pipeline running 78 kilometers between 'Uthmaniya and Abqaiq, a booster station at Wariah on the company's 30-31-in. Qatif-Qaisumah pipeline, and an additional underwater pipeline to Bahrain. Two of the five new gas-oil separator plants were constructed in the Ain Dar area — making a total of four in that field. One was built in the 'Uthmaniya area, the first to be installed there. Two smaller plants were completed in the Qatif Field, making a total of three at that point. The completion of the Wariah booster station in August increased the capacity of the pipeline from Wariah to Qaisumah by 10,000 B/D. This made the Qatif-Qaisumah pipeline more flexible and assured Tapline of being able to pump at full capacity at all times.

Flow lines totalling 98 kilometers in length were completed to tie in 19 new wells for the gas-oil separator plants. An additional 12-in. pipeline, 26 kilometers long, was completed between Saudi Arabia and Bahrain in November. This marine line was designed to supplement the existing pipeline system.

The refinery at Ras Tanura ran an average of 169,957 B/D. This represents a record for this refinery which was originally designed to run 50,000 B/D and has subsequently been redesigned and expanded. One interesting addition to this refinery is the asphalt plant whose output was over 200,000 bbl during the year. Much of this asphalt is used for the construction of roads in Saudi Arabia. Other interesting projects were the completion of a new 10,000 kw turbo-generator at Ras Tanura and additional work on enlargement of the Abqaiq power plant, as well as auxiliary sub-stations and distribution lines. Supply of water for Abqaiq was augmented by the construction of 32 kilometers of 20-22-in. water line from a new system of water wells.

An interesting development in local marketing is the rapidly increasing demand for petroleum products within Saudi Arabia. A number of bulk plants have been erected — the principal ones being at Dhahran, which loads out 150 to 175 railroad tank cars to be sent into the interior of Saudi Arabia each month. The initial units of a large bulk plant at Jeddah were also completed as well as a marine terminal. In June, the first tanker called at this terminal and delivered 113,000 bbl of petroleum products. A large pressure maintenance plant is being constructed at Abqaiq and work progressed actively on this project throughout 1952.

The most outstanding field development during the year was the rapid development of the Ghawar area, which includes the Ain Dar, 'Uthmaniya and Shedgum producing areas. The latter two fields have not yet been developed to the point where accurate estimates can be made of their size. In addition, the drilling activity in the offshore portion of Safaniya Field went ahead actively, but in this area also there is not yet sufficient information at hand to determine the size of the field.

Trans-Arabian Pipe Line Co.

Tapline's average pumpings for 1952 were 312,940 B/D and the average liftings at Sidon Terminal were 309,274 B/D. During the year, 992 ships loaded at the Terminal, with an average cargo of 114,107 bbl, and an average loading rate of 15,145 bbl per hour.

Expansion of the terminal was completed with the addition of four 180,000-bbl tanks, bringing the total crude storage to 20 180,000-bbl tanks and one 25,000-bbl tank. In addition, three 100,000-bbl tanks were put in service for storage of bunker and diesel fuel. Also, a fifth submarine berth was added, which gave the terminal a peak loading capacity of about 1,000,000 B/D.

An interesting project completed during 1952 has been the installation of vertical booster pumps in the line where it enters three of the pump stations. This device reduces the incoming pressure to a minimum, and permits adjustments in pumping schedules which result in an increase of 4,000 B/D thruput.

Table 2 — World Crude Oil Reserves as of Jan. 1
(Billions of Bbl)

	1935	1940	1945	1949	1950	1951	1952	1953
United States	12.2	18.5	20.5	23.3	24.6	25.3	27.5	29.0
Other Western Hemisphere	3.0	3.1	7.5	10.3	12.6	13.2	12.1	12.2
Total Western Hemisphere	15.2	21.6	28.0	33.6	37.2	38.5	39.6	41.2
Middle East								
Bahrain			0.1	0.3	0.2	0.2	0.3	0.3
Iran	2.2	3.5	5.5	8.0	7.0	13.0	15.0	15.0
Iraq	1.5	2.5	4.0	6.5	5.1	9.0	10.0	12.0
Kuwait			4.0	10.0	11.0	15.0	15.0	20.0
Qatar			0.1	0.7	0.1	1.0	1.2	1.5
Saudi Arabia			2.0	6.7	9.0	10.0	12.0	16.0
Total Middle East	3.7	6.0	15.7	32.2	32.4	48.2	53.5	64.8
Other Eastern Hemisphere (except USSR and Satellites)	1.5	2.3	1.0	1.6	2.0	1.7	2.5	2.6
Free World	20.4	29.9	44.7	67.4	71.6	88.4	95.6	108.6
USSR and Satellites	3.0	5.0	6.5	8.7	4.8	5.9	8.1	9.6
Total World	23.4	34.9	51.2	76.1	76.4	94.3	103.7	118.2

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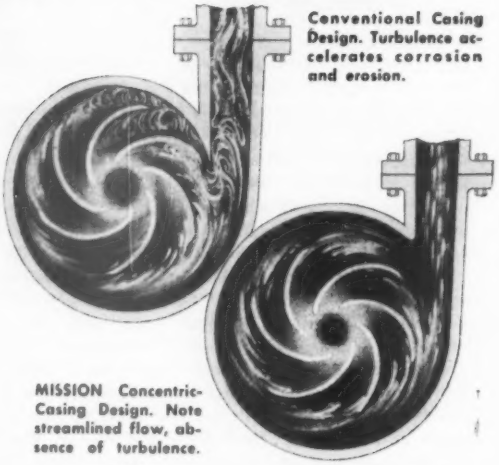
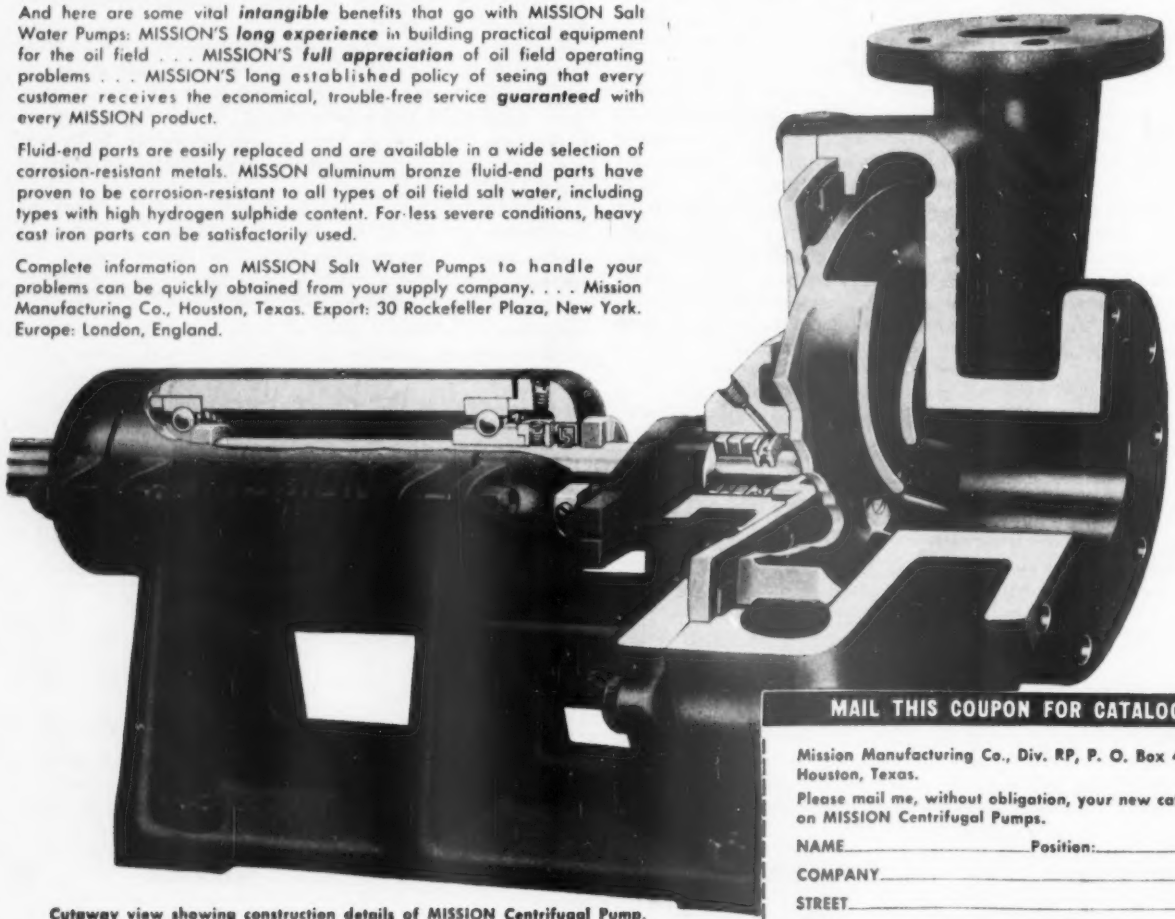


Conventional Casing Design. Turbulence accelerates corrosion and erosion.

MISSION Concentric-Casing Design. Note streamlined flow, absence of turbulence.



Cutaway view showing construction details of MISSION Centrifugal Pump.

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EUROPE - A Review of 1952 Production

By A. H. Chapman

Arabian American Oil Co.

Production figures generally increased throughout Western European countries during 1952. Exploration parties also increased and the expanding market for natural gas in Italy spurred new pipeline construction.

GERMANY

Although the official statistics have not yet been published, it appears that Germmany's production in 1952 will prove to be around 12,400,000 bbl, or about 33,850 B/D. This represents a marked increase over 1951 when 9,670,000 bbl were produced, or a daily average of about 26,450 B/D.

The increase of over 2,900,000 bbl in 1952 is due mainly to the development of fields discovered in 1951 or earlier which have only now reached their full development. The greatest single contribution has been from the Ruhlermoor-Ruhlertwist Field (discovered in 1949) which increased its production by 735,000 bbl in 1952. Hohne (discovered in 1951) increased its production by 492,000 bbl, Suderbruch production was up 440,000 bbl and Eldingen had an increase of 360,000 bbl. Hemmelte-West, discovered in 1951, but developed mainly in 1952, had an increase of about 240,000 bbl. These previously discovered fields together were responsible for an increase in production of about 2,267,000 bbl out of the 2,900,000 bbl net increase.

The fields actually discovered in 1952 contributed relatively little to the growth in production, due to the usual lag in development. Boostedt contributed 43,300 bbl, Ploen has so far produced about 11,400 bbl and Lehrte only about 1,900 bbl. Altogether these new fields upped the production only about 60,000 bbl.

Four other new fields were discovered for which production figures have not been reported or are incomplete; Hohenwodhrden, Vorhop, Aldorf (Dueste) and Stockstadt. These fields have as yet had only an insignificant effect upon the total production.

New pay-zones were discovered in Eddesse-Nord, in addition to Hohne and Suderbruch which have already been mentioned. The large increases in production in Hohne and Suderbruch are due only in small part to the new pay-zone discoveries made in 1952.

In addition to the above, there were modest increases in a large number of the older fields which, taken collectively, not only offset the decline in certain fields such as Emlichheim, but contribute 600,000 bbl and more to the net increase.

In summary we may note that production in 1952 was increased by about 23.5 per cent over 1951, and that this was largely a result of a series of accumulated discoveries and developments beginning as far back as 1949. The full effect of the discoveries made in 1952 will therefore probably not be felt until 1954 or later.

FRANCE

Production in France rose from about 2,050,000 bbl or 5,700 B/D in 1951, to an estimated 2,450,000 bbl or 6,450 B/D in 1952.

The increase in production was largely due to the continued development of the Lacq Field in southwestern Aquitaine where production was increased from 156,000 bbl/month in the latter part of 1951 to around 178,000 bbl/month in the later months of 1952.

During the year the new field Gallician in Languedoc, discovered in 1951, was brought into production but the output was too small to have any great effect upon the national supply. The production over the year averaged about 700 bbl/month. The new field in the Rhone Valley, Staffelfelden, discovered late in 1951, reported a small production in the last quarter of 1952, initial production being of the order of 800 bbl/month.

No new fields were discovered in France in 1952, although a considerable amount of drilling was done, especially in the Aquitaine basin north of the Pyranees.

HOLLAND

During 1952, nine rigs were operated throughout the year. Of the eight exploratory wells drilled, only one was successful in locating a new gas area. In the known proven areas, 37 new oil wells and seven new gas wells were completed. Production in Holland during 1952 averaged about 13,700 B/D, practically unchanged from 1951.

UNITED KINGDOM

Production in the United Kingdom averaged about 5,100 B/D during the year 1952. This is a slight increase over 1951 and results from a water-flooding program conducted by the Anglo-Iranian Oil Co. in its fields in the Midlands. No new fields were discovered during the year, but Anglo-Iranian is continuing exploratory drilling in the Formby area on the northwestern coast of England.

ITALY

Oil production in 1952 in Italy averaged approximately 1,300 B/D which represents a great increase from the average of about 400 B/D in 1951. Most of the production came from the operations of the Azienda Generale Italiana Petroli. This is a government-owned company which enjoys almost exclusive operating advantages.

The principal developments in Italy during the year, however, were in the field of natural gas. Tremendous strides were made during the year not only in the development of new gas fields but in the construction of a gas distributing system to make gas available to the principal industrial centers of the country. This industry is operated exclusively by Azienda General Italiana Petroli, which has achieved a gas production during the year of over 52 billion cu ft from a large number

Continued on Page 10, Section 2

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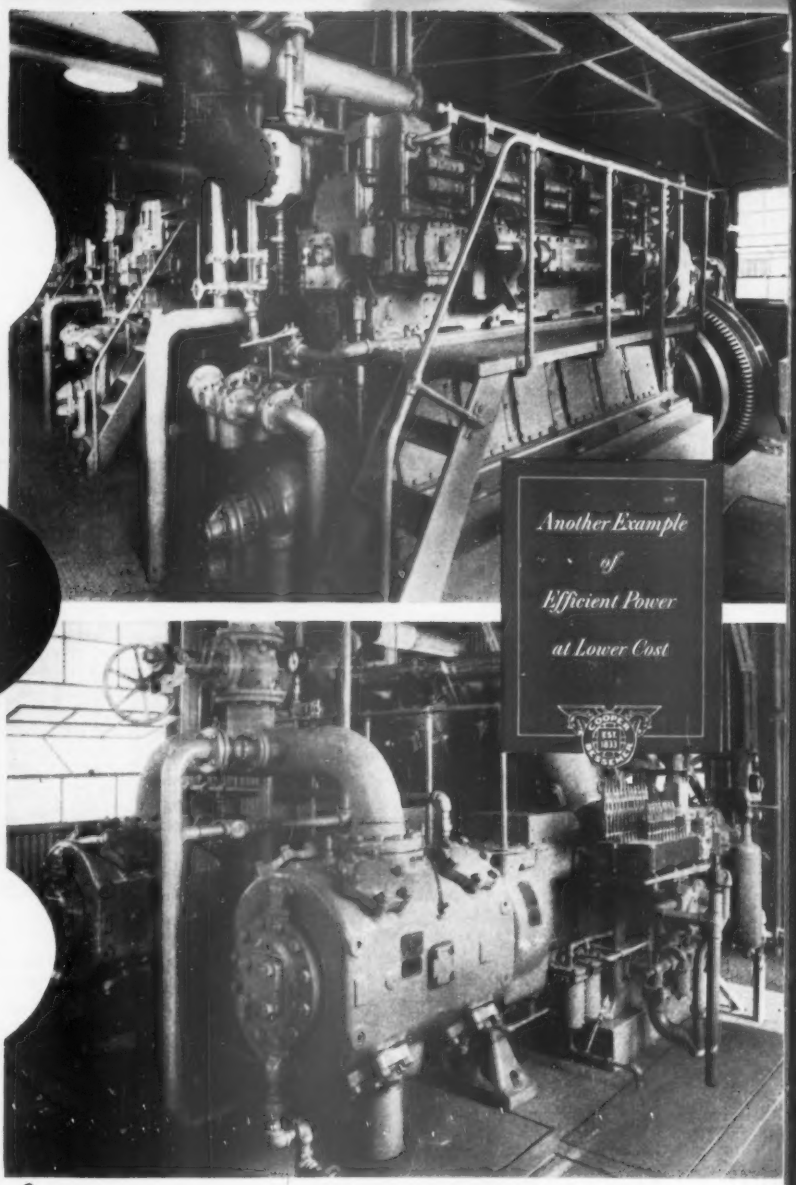

The new natural gasoline plant of the Hugoton Plains Gas and Oil Company, now operating about a year, is powered by the Cooper-Bessemer units shown above. These consist of three JS-6 540 hp gas engines driving 368 KW A.C. generators, and a 308 hp GMX V-angle compressor.

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The three JS gas engines operate 24 hours a day, furnish all electric power required to operate the plant. Using Cooper-Bessemer's latest development in high compression operation, these modern engines attain 34.4% thermal efficiency, holding fuel consumption to less than 7400 BTU/bhp/hr.

The GMX is used as a propane refrigeration unit. And here, as in other processing services, this modern Cooper-Bessemer V-angle compressor is showing a consistent record of trouble-free, low-cost performance under continuous operation.

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FAR EAST - A Review of 1952 Production

By E. W. Berlin
Standard Vacuum Co.

Increasing taxes and pressure to achieve a balance of trade is adversely affecting development of petroleum resources in most Far Eastern countries. In most countries, however, production is still on the upswing.

For five consecutive years since the close of hostilities in the Far East the political atmosphere dominates to a great extent the development and expansion of the petroleum industry with the exception of Japan. The tendency towards nationalization and limiting legislation has been a factor in many of the countries of the Far East. The continental economic pressure to achieve a favorable balance of trade in each of the individual countries of the Far East has from time to time increased the tax burden until there is little margin for incentive to attract foreign capital.

Little is known of the industry's activities behind the so-called "bamboo curtain" other than production is still being withdrawn from the Kansu Field in China and from Russian-dominated Sakhalin fields.

INDONESIA GENERAL

The new Government of Indonesia still is faced with many problems of an economic and political nature and some progress was made in these areas during 1952. However, the question of returning producing properties to their prewar owners and operators is still not settled as far as the North Sumatra and mid-Java areas are concerned. The Shell and Standard-Vacuum organizations have not been afforded an opportunity to return to their North Sumatra fields which were denied during the war and have not yet been repossessed.

	Crude Oil Production (in U.S. bbls)		
	Daily Average	Yearly Total	Production to Date
1951	159,100	58,065,300	1,289,065,300
1952	168,000	61,320,000	1,350,385,300

MID-SUMATRA

Production was taken from the Caltex Field at Minas which was based on production through a pipeline and river transport system in May, 1952, and was producing at a rate of 27,000 B/D towards the end of the year. Standard-Vacuum Petroleum Mij.'s Lirik-Ukui fields were produced for test purposes and local use only. Three strings of development tools were used during the year, drilling completed 46 wells of which two were dry. During the year exploration effort in the area included 34 party months of geological investigations, 24 party months of geophysical investigations, and five wildcat tests were drilled resulting in two discoveries and three dry holes. One wildcat test was drilling at year end.

	Crude Oil Production (in U.S. bbls)	
	Daily Average	Yearly Total
1951	29	10,521
1952	16,400	6,012,000

SOUTH SUMATRA (INCLUDING DJAMBI)

Production from the fields in South Sumatra was refined at the two refineries located near Palembag. Nine development strings of tools were used in South Sumatra during the year, completing some 53 development wells of which three were dry holes. Exploration work in South Sumatra utilized 48 party months of geological field work, 55 party months of gravity meter work, 47 party months of seismic work. Fourteen exploration tests were drilled resulting in two producers and 12 dry holes and three drilling at year end. Two wildcat tests resulted in two small producing areas in Standard-Vacuum Pet. Mij.'s Radja Block.

	Crude Oil Production (in U.S. bbls)	
	Daily Average	Yearly Total
1951	121,000	44,165,000
1952	120,000	43,920,000

Indonesian worker at a Christmas tree of a Caltex Pacific well in the Minas Field.

JAVA

Although all of the prewar properties have not been returned to their original owners, considerable rehabilitation work was carried out on some of the East Java fields. One drilling rig was used on development work completing five development wells. Exploration effort included 12 party months geological work and 12 party months of gravity meter work.

	Crude Oil Production (in U.S. bbls)	
	Daily Average	Yearly Total
1951	12,600	4,581,300
1952	15,000	5,490,000

EAST BORNEO

Four strings of tools were used in development work in this area during the year, completing 12 wells. Exploration effort included 24 party months of geological work and 12 party months of gravity meter investigations. One exploration test was drilling at year's end.

	Crude Oil Production (in U.S. bbls)	
	Daily Average	Yearly Total
1951	15,420	5,628,300
1952	16,000	5,856,000

BRITISH BORNEO

Five strings of tools were used for development drilling, completing some 23 producers and one dry hole. In addition, some remedial work on present producers was carried out. The exploration effort in this area included 24 party months of geological work, 12 party months of gravity meter work and 24 party months of geophysical work. Two wildcat tests were drilled during the year with negative results. One was drilling at year's end.

	Crude Oil Production (in U.S. bbls)		
	Daily Average	Yearly Total	Production to Date
1951	102,750	37,505,400	245,982,400
1952	105,000	38,430,000	284,412,400

NETHERLANDS NEW GUINEA

Three development rigs were used during the year drilling eight producers and one dry hole as well as reconditioning two prewar discoveries. Exploration effort in this area included 26 party months of geological investigations, 24 party months of gravity meter work and 24 party months of seismic effort. Exploration drilling included three exploration tests with negative results.

	Crude Oil Production (in U.S. bbls)		
	Daily Average	Yearly Total	Production to Date
1951	4,780	1,745,800	5,377,900
1952	4,713	1,725,000	7,102,800

AUSTRALIAN NEW GUINEA (PAPUA AND MANDATED TERRITORY)

The exploration effort in this area included 12 party months of geological field work and 36 party months of seismic exploration work. One wildcat test was completed, a dry hole, and the second wildcat test was drilling at 12,000 ft at year's end.

AUSTRALIA

Bureau of Mineral Resources continues to carry out some geological mapping work as well as some geophysical survey work. The Caltex Ampol Petroleum, Ltd., holdings on the west coastal region of Australia are reported to have been surveyed by surface geological parties. An exploration well drilled by a local Australian company near the town of Roma, Queensland, was drilling at year's end.

JAPAN

During the year much interest was displayed in the deeper producing horizons in the Ybase Field in Honshu. The development of this deeper producing horizon lent encouragement to the Japanese oil endeavor. Exploration field activities continued at approximately the same level as in 1951 with some 200 party months of geological and geophysical surveys being conducted during the year. Most of this work was carried out on the northwest basin of Honshu. Also, some gravity meter work was directed towards the interpretation of the possible petroleum potentialities in the Kanto Plains area north of Tokyo.

	Crude Oil Production (in U.S. bbls)		
	Daily Average	Yearly Total	Production to Date
1951	6,390	2,332,350	98,557,270
1952	5,900	2,159,400	100,716,670

PHILIPPINE ISLANDS

Very limited amount of exploration work was carried out in the Philippines and no discoveries made. However, one wildcat test was completed, a dry hole.

FORMOSA

No new developments occurred in Formosa. Production reported at 270 B/D, most of which is ditillate from gas produced.

INDIA

The Assam Oil Co. continued its search for additional productive areas in Assam drilling two wildcat tests and operating three geological parties and one geophysical party. Production is estimated at 5,600 B/D for the year 1952.

PAKISTAN

The four small fields in the Punjab area continued to produce throughout the year. Estimated production for the year was 4,000 B/D. A successful wildcat well was reported near the old Dhulian Field which produced 250 B/D. Three other wildcat tests were started, two of which were abandoned as failures and one was drilling at year's end.

BURMA

Estimated production for the year was at a rate of 2,300 B/D. Political climate in Burma is reported improved but the petroleum industry has not attained its prewar status in this disturbed state. It is understood an 8,000 B/D topping plant will be on stream early in 1953 and that potential production from mid-Burma fields will then reach a level of 8,000 B/D. The prewar refinery of the Burmah Oil Co. and the pipelines connecting this refinery with the Burma oil fields has not been rehabilitated.

AFRICA - A Review of 1952 Production

By A. H. Chapman
Arabian American Oil Co.

New exploratory activity and searching geophysical crews dominate the picture in Africa development-wise in spite of increasing reserves in the Middle East and abundant producing and refining facilities there.

In spite of the vast reserves that have been developed in the Middle East and elsewhere in the world, and the abundant producing facilities which are currently in operation, the international petroleum industry undertook in 1952 a widespread exploratory campaign on the African Continent. This campaign displays the vigor of the industry and the unceasing struggle to develop new producing areas.

FRENCH MOROCCO

The only exploration company in French Morocco is the Societe Cherifienne des Petroles, commonly called SCP. This company is owned 40 per cent by the French Government, 40 per cent by the Sultan of Morocco, 11 per cent by the CFP and the remainder by private interests. Production in French Morocco averaged about 2,100 B/D in 1952. There were about 64 producing wells with depths ranging from 2,000 ft to 4,150 ft. SCP is now developing five oil fields and operates a refinery with a capacity of about 1,400 B/D. It is believed that the company will complete more than 20 exploratory wells in 1953.

ALGERIA

Average production in Algeria amounted to nearly 1,000 B/D in 1952. The only producing field is called Oued Geuterni. This field was discovered in 1949 and is producing from about 57 wells. It is operated by the French group known as Societe Nationale Repal. This company is owned half by the Government of Algeria and half by a French group.

There was considerable activity during 1952 in the negotiation of concessions. The Repal group has been consolidating its position but the most interesting development is the entrance of the Shell Co. into the field.

Shell's concession extends to about 93,000 square miles and is located in the Algeria-Sahara desert region. Another French group has taken out a concession of 149,000 square miles in the southern Algeria-Sahara country. Standard Oil (N.J.) examined the geology of Algeria during 1949 and 1950 but has not taken out any concession.

TUNISIA

Three companies are actively exploring in Tunisia. The French group called SEREPT, the Shell Oil Co., and the Gulf Oil Co. A large number of unsuccessful exploratory wells have been drilled in the northwestern part of the country, but active exploration is continuing and additional deep tests will shortly be undertaken in the central part of the country to the south of the port of Sousse. A company active in this area is the Companie des Petroles, an associate of the Royal Dutch Shell Group, which holds an exploration permit over about 15,000 square kilometers. Drilling with an Ideal 100 outfit began at Zeramedine in September, 1951, but the well was abandoned at a depth of 6,724 ft. Another well is now being drilled at Ktitir, some 20 miles south of Kairouan. The rig is capable of reaching a depth of 10,000 to 12,000 ft.

EGYPT

The only two producing companies are the Anglo-Egyptian Oilfields, Ltd., and Socony-Vacuum Oil Co. of Egypt. The former operates oilfields at Hurghada and Ras Gharib, on the west side of the Gulf of Suez, while operations in Sinai on the east side of the Gulf are carried out jointly by both companies, who share equally the production from the Sudr and Asl Fields. A third oilfield in Sinai, at Ras Matarma, is not in production since no lease has yet been granted. Hurghada was discovered by A.E.O. in 1913, and production at Ras Gharib was started in 1938. The fields in the Sinai Peninsula have all been developed since 1948.

The crude oil is shipped by tanker from the fields to Suez where there are two refineries, one owned by A.E.O. with a throughput capacity of some 40,000 B/D, and the other by the Egyptian Government having a throughput of around 5,000 B/D. The refined products are entirely absorbed by the home market.

The Egyptian oilfields are situated in desert country, Ras Gharib in particular is 140 miles distant from the nearest town. Modern townships with all necessary services and amenities for the employees have been built in the various fields.

The Ras Gharib Field is currently producing about 23,000 B/D; during 1952, one drilling string successfully completed six infilling wells, and at the end of the year this was the only string still operating in Egypt.

Hurghada is now in the later stages of its productive life, and now only produces 700 B/D. Production from Sudr amounts to some 5,600 B/D. Three wells were completed early in 1952, but drilling was terminated in April since no further prospects remained.

Two wells were completed in Asl during the first quarter of 1952, one being a successful producer and the other being abandoned as a dry hole. Drilling then ceased due to the lack of further objectives. Production from this field is now at the rate of approximately 16,400 B/D.

No exploration drilling was carried out during 1952 due to the absence of a satisfactory mining law and pending negotiations with the government on other essential conditions.

ETHIOPIA

The only oil concession in Ethiopia is operated by the Sinclair Oil Co. which, during 1952, drilled its second well with inconclusive results.

Continued on Page 5, Section 2

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Petroleum Branch Affairs

. . . as interpreted by JESS E. ADKINS
Editor, Journal of Petroleum Technology

The aim of all publications is to satisfy reader interest in any particular field, whether popular or specialized. Such is the aim of this journal. Not all publications, however, are as fortunate as this one in knowing almost precisely the limits of interests of its readers. Being a professional journal, it necessarily is limited in scope to the interests of the profession which it serves, *i.e.*, petroleum engineering. This is especially true of the technical material, or *Transactions*, contained herein.

It is therefore with some pride that the Petroleum Branch, AIME, submits that, according to the expressions of its members, the JOURNAL OF PETROLEUM TECHNOLOGY served the interests of the petroleum engineer well during 1952.

During the year, 186 papers and articles were published in PETROLEUM TECHNOLOGY covering the fields of exploration, drilling, production of petroleum, production of gas, and economics. In addition, some 16 papers and articles were of a general nature not classifiable in the above categories. Here is a breakdown of the type of papers published in 1952 and their percentages to the whole:

Subject	Number Papers	Number Pages	Per Cent of Total
Exploration	5	27.58	4.70
Drilling	21	78.46	13.61
Production	49	191.78	33.45
Gas	80	127.42	22.11
Economics	15	48.53	8.43
General	16	102.50	17.70
	186	576.27	100.00

The Petroleum Branch office recently sampled the membership as to the field in which each member is primarily interested. It was a 50 per cent sample in that half the membership was sent questionnaires indiscriminately. Some 2,150 questionnaires were distributed and 659 were returned for a percentage return of 30.5 per cent, more than enough for an accurate gauge of sentiments. The results of that sample were published on Page 1, Section 2 of the July, 1952, issue of PETROLEUM TECHNOLOGY. The actual experience of publishing during the year corresponded generally to the desires and interests of Petroleum Branch members.

Briefly, the results of the sample were as follows:

Field	Interest Ratio
Rotary Drilling	13.1
Well Completions	25.5
Gas Technology	9.2
Production	41.4
Miscellaneous	10.8
	100.0

Under the general term "miscellaneous" were such fields of interest as economics, refining, management, engineering education, and exploration. As may be seen, the results of the sample indicated that 41.4 per cent of the membership are primarily interested in production. The record shows that during 1952, the number of production papers and articles published in PETROLEUM TECHNOLOGY amounted to 33.45 per cent of total editorial pages published. Here, the demand exceeded the supply, so to speak. But in order to devote nearly half the editorial pages to the techniques of production would mean a sacrifice on the part of readers desiring articles and papers concerning other phases of the industry. Therefore, it is believed that a proper ratio of production papers to all other papers has been arrived at in the 33.45 per cent figure.

The drilling phase is extremely well coordinated as is brought out in the two tables above. The phase of well completions was set apart and no correlation between published papers and expressed interest in the subject will be attempted here in that it could fall under drilling or production, depending upon the point of view. It might be said, however, that well completion papers appeared in considerable volume throughout the year.

All these percentage figures mentioned above are in relation to total *editorial* pages published. Aside from the 576.27 pages of editorial material, 243.73 pages of advertising were published. We feel this to be a good balance in that it gives a little more than two pages of editorial material for each advertising page. The trade publications go to press with between 40 and 60 per cent of their pages devoted to advertising directly. ★ ★ ★

Texas Sections Win Contests

Texas Local Sections walked off with the honors in the membership contests for 1952. Awards were presented at the Annual Meeting to the West Central Texas Local Section, winner of the Petroleum Branch contest, and to the Southwest Texas Section, which had both the highest percentage and highest number of applications in the all-Institute contest.

In the picture below, Paul R. Turnbull, 1952 Branch Chairman, congratulates Fred Nussbaumer, director and delegate from the West Central Texas Section, on winning the Branch contest. The section increased its membership by 29.1 per cent during the last four months of the year, based on its Sept. 1 membership of 45. The prize was a lantern slide projector.

The Southwest Texas Section won the "President's Banner" with a 33.5 per cent increase from April 1 to Dec. 31. The section turned in 87 applications during this period, and also won the gavel for the most applications regardless of previous membership. The same section won second place in the Branch contest with 18.6 per cent increase from Sept. 1 to Dec. 31.

Runners-up in the Banner contest were Permian Basin, 25.0 per cent; North Texas, 23.2; Mid-Continent, 20.2; and Lehigh Valley, 18.2. Third place in the Branch contest was held by Mid-Continent Section with 15.7 per cent. Runners-up in the gavel contest were Mid-Continent, 79 applications; Chicago, 72; Permian Basin, 71; and New York, 65. ★ ★ ★

Enjoying a free moment before the Branch Banquet are (L. to R.) Roland Gouldy, Lloyd Elkins and W. S. Morris.

Andrew Fletcher, right, 1953 AIME president, chats with G. L. Yates, left, and Paul R. Turnbull after Banquet.

Above, Morris Muskat, C. R. Dodson and E. N. Van Duzee find an amusing subject while below, Claude R. Hocott, right, and Howard Vesper, banquet speaker, exchange views. The formally attired gentlemen, below right, are Eugene Holman, Morris Muskat and Michael Haider at the Annual Banquet of the Institute. Holman and Muskat both received awards.

2,500 at AIME Annual Meet

Approximately 2,500 members and guests were registered at the 175th Annual Meeting of the AIME held last month in Los Angeles, Calif. Of that number an estimated 500 were Petroleum Branch members. Near perfect weather prevailed and contributed to the fine attendance at all functions.

Andrew Fletcher of St. Joseph Lead Co. assumed leadership of the Institute from Michael Haider, Standard Oil Co. (N.J.), for the current year and Claude R. Hocott, Humble Oil and Refining Co. became 1953 Chairman of the Petroleum Branch, succeeding Paul R. Turnbull of the La Gloria Corp.

Prominent men of the industry and politics spoke to the combined meeting of the three Branches of the Institute. Gov. Dan Thornton of Colorado addressed the membership at the Welcoming Luncheon, asserting his faith in the future of the mining and petroleum industries. Howard G. Vesper, president of California Research Corp., spoke at the Petroleum Branch Banquet on the future fuels required to power automobiles now on the drawing boards.

The annual Production Review Session of the Petroleum Branch proved to be one of the more popular sessions on the Branch program. The Production Review Committee, headed by R. B. Gilmore, A. H. Chapman and Milton Williams, presented production figures and reserve estimates of every major producing region in the world.

Another popular session was the symposium on valuation of oil and gas properties headed by Kenneth E. Hill and Everett G. Trostel, associate chairmen. ★ ★ ★

Schedule of Local Section Meetings

DELTA SECTION

Meeting City: New Orleans, La.

CHAIRMAN	SECRETARY
R. S. Sullins	Byron L. Francis
Humble Oil & Ref. Co.	The Texas Co.
New Orleans, La.	New Orleans, La.
AU-8751	CA-8592

Meets second Tuesday each month

EAST TEXAS SECTION

Meeting Place: Gregg County Airport

CHAIRMAN	SECRETARY
H. L. Long	H. D. Miller
Independent Oil Op.	Amerada Pet. Corp.
Kilgore, Tex.	Longview, Tex.
Phone 4416	Phone 1878

Meets second Tuesday each month

FORT WORTH SECTION

Meeting City: Fort Worth, Tex.

CHAIRMAN	SECRETARY
H. J. Gruy	T. M. Curtis
Consultant	Stanolind Oil & Gas
Fort Worth, Tex.	Fort Worth, Tex.
FO-6157	FO-5661

Meets third Tuesday each month

GULF COAST SECTION

Meeting City: Houston, Tex.

CHAIRMAN	SECRETARY
Kenneth B. Ford	Pete Cawthon, Jr.
J. R. Butler & Co.	City National Bank
Houston, Tex.	Houston, Tex.
AT-9455	FA-2131

Meets third Tuesday each month

ILLINOIS BASIN CHAPTER

Meeting City: Salem, Ill.

CHAIRMAN	SECRETARY
Jerry Vaughan	Harry Bridges
Sun Oil Co.	Shell Oil Co.
Evansville, Ind.	Centralia, Ill.
Phone 3-4291	Phone 711

Meets first Thursday each month
(No meetings during July and August)

KANSAS SECTION

Meeting Cities: Wichita and Great Bend, Kans.

CHAIRMAN	SECRETARY
J. R. Puckett	John T. Gary
Magnolia Pet. Co.	Continental Oil Co.
Wichita, Kans.	Wichita, Kans.
4-1301	7-8347

Meets second Wednesday each month
(No meetings during July and August)

LOU-ARK SECTION

Meeting City, Shreveport, La.

CHAIRMAN	SECRETARY
A. H. Crawford	L. R. Lacy
Crawford Drilling Co.	Phillips Pet. Co.
Shreveport, La.	Shreveport, La.
4-4441	2-3124

Meets tentatively first Monday each month

MID-CONTINENT SECTION

Meeting City: Tulsa, Okla.

CHAIRMAN	SECRETARY
J. H. Beesley	S. F. Bird
Baroid Sales Div.	Amerada Pet. Co.
Tulsa, Okla.	Tulsa, Okla.
Phone 28161	Phone 36251

Meets second Monday each month
(Study Group meets fourth Tuesday each month)
(Luncheon meetings each Thursday, Mayo Hotel)

NORTH TEXAS SECTION

Meeting City: Dallas, Tex.

CHAIRMAN	SECRETARY
E. R. Brownscombe	T. E. Morton
Atlantic Ref. Co.	Halliburton Oil Well Cem. Co.
Dallas, Tex.	Dallas, Tex.
PR-6484	RI-3841

Meets third Monday each month

OKLAHOMA CITY SECTION

Meeting City: Oklahoma City, Okla.

CHAIRMAN	SECRETARY
L. F. Elkins	C. R. Miller
Sohio Petroleum Co.	Schlumberger Well Surv. Corp.
Oklahoma City	Oklahoma City
RE-90511	RE-91487

Meets third Thursday each month

PACIFIC PETROLEUM CHAPTER

Meeting City: Los Angeles, Calif.

CHAIRMAN	SECRETARY
F. L. Wadsworth	C. K. Ferguson
General Pet. Corp.	California Research Corp.
Los Angeles, Calif.	La Habra, Calif.
MA6-5711	OX7-1721

PERMIAN BASIN SECTION

Meeting Cities: Midland and Odessa, Tex.

CHAIRMAN	SECRETARY
J. C. Blackwood	Maurice Lewis, Jr.
Amerada Pet. Corp.	British-American Oil Prod. Co.
Midland, Tex.	Midland, Tex.
Phone 4-5533	Phone 4-8021

Meets third Monday each month

SAN JOAQUIN VALLEY GROUP

(of Pacific Petroleum Chapter)

Meeting City: Bakersfield, Calif.

CHAIRMAN	SECRETARY
R. P. Mangold	C. A. Davis
D. K. Partnerships	Richfield Oil Corp.
Bakersfield, Calif.	Bakersfield, Calif.
Bakersfield 32561	Maricopa 92631

Meets first Tuesday alternate months
(Feb., April, June, Aug., Oct., Dec.)

SOUTH PLAINS SECTION

Meeting City, Lubbock, Tex.

CHAIRMAN	SECRETARY
J. W. Brown	J. B. Livingston
Stanolind Oil & Gas	Haliburton Oil Well Cem. Co.
Brownfield, Tex.	Lubbock, Tex.
Phone 2166	Phone 5-5725

Meets third Thursday each month

SOUTHWEST TEXAS SECTION

Meeting City: Corpus Christi, Tex.

CHAIRMAN	SECRETARY
Ivan Tucker	Chester L. Wheless
Atlantic Ref. Co.	La Gloria Corp.
Corpus Christi, Tex.	Corpus Christi ,Tex
Phone 3-9372	Phone 3-8553

Meets third Wednesday each month
(No meetings July, August and December)

WEST CENTRAL TEXAS SECTION

Meeting City: Abilene, Tex.

CHAIRMAN	SECRETARY
J. L. Coulson	J. E. Russell
Warren Pet. Corp.	Reddin Oper. Comm.
Abilene, Tex.	Abilene, Tex.
Phone 4-8113	Phone 2-4031

Meets third Wednesday each month

WYOMING SECTION

Meeting City: Casper, Wyo.

CHAIRMAN	SECRETARY
R. D. Ferguson	W. R. Kahla
U. S. Geological Surv.	Ohio Oil Co.
Casper, Wyo.	Casper, Wyo.
Phone 3-4561	Phone 3-5721

Meets in alternate months
(No specific dates set)

ADVANCE AIME MEETING CALENDAR

	1953	1954
AIME Annual Meeting		Feb. 14-18 Statler Hotel New York
AIME Fall Meeting	El Paso	
Petroleum Branch Fall Meeting (Mid-Continent)	Oct. 18-21 Baker and Adolphus Hotels, Dallas	San Antonio, Tex.
Regional Meeting, Pacific Petroleum Chapter	Oct. 1-2 Ambassador Hotel Los Angeles	Not determined

Proposed for Membership, Petroleum Branch

Total AIME membership on Dec. 31, 1952, was 18,643; in addition 1,964 Student Associates were enrolled.

PETROLEUM BRANCH ADMISSIONS COMMITTEE

J. H. Sullivan, Chairman; Thomas S. Bacon, Vice-Chairman; A. E. Caraway, Frank C. Kelton, Thomas E. Morton and F. C. Prutzman.

INSTITUTE ADMISSIONS COMMITTEE

T. D. Jones, Chairman; Thomas G. Moore, Vice-Chairman; Harold S. Bell, F. W. Hanson, R. H. Chadwick, T. W. Nelson, J. H. Scaff, John T. Sherman, A. C. Brinker, Ivan Given, C. A. R. Lambly, G. P. Lutjen, E. A. Prentis and C. Leslie Rice, Jr.

The Institute desires to extend its privileges to every person to whom it can be of service, but does not desire as members persons who are unqualified. Institute members are urged to review this list as soon as possible and immediately to inform the Secretary's office if names of people are found who are known to be unqualified for AIME membership.

In the following list C/S means change of status; R, reinstatement; M, Member; J, Junior Member; A, Associate Member; S, Student Associate.

CALIFORNIA

Albany — Abel, Leo Wayne (C/S-S-J).
Bakersfield — Lindblom, Robert Grant (J).
Berkeley — Castelain, Marcel Oswald (J).
Coalinga — Dumett, Clem Wallace, Jr. (J).
Gardena — Foss, Daniel Lee (C/S-S-J).
Long Beach — Moore, Thomas Arthur (J).
Los Angeles — Fisk, Edward Penn (A).
Lynwood — Moody, Charles Colburn Bills (J).
Montrose — Cheadle, George Dodds (J).
Palos Verdes Estates — Stewart, James S. (R,C/S-S-J).
Pasadena — Wilson, Doyne Lester (M).
South Gate — Grant, Howard Kenneth (C/S-J-M).
Taft — Meaney, Daniel (M).
Ventura — Andersen, Jack Francis (J); Humphreys, David William (R,C/S-S-J); Stafford, Robert W. (M); Swiers, Donald Glen (J).

ILLINOIS

Fellwood — Nelles, Maurice (M).

KANSAS

Wichita — Chappell, Leo Gregg (M).

LOUISIANA

Harvey — Eggleston, Alan Freeman (A).
Jonesboro — Smith, Donald Raymond (C/S-J-M).
New Orleans — Dausch, George, Jr. (J); Dunn, Edward Albert (J); Hubbard, Christopher Bemis (J); Langston, James Volney (J); McCabe, John Alfred (C/S-S-J); Wilson, Henry Martin, Jr. (J).
Shreveport — Crawford, Adolph Harrison (C/S-J-M); Eyre, William Preston (J); Fowler, Henry Florey (C/S-A-M); Roy, Robert Albert (M).

MICHIGAN

Roscommon—Beutel, Richard Armstrong (R, C/S-S-J).

MINNESOTA

Duluth — Adams, Malcolm McNeill (M).

MONTANA

Billings — Budd, Harrell, Jr. (R,C/S-S-J).

NEW MEXICO

Hobbs — Edwardson, Merrill John (J); Junkin, Eben Dixon, Jr. (J).
Monument — Abbott, Richard Harwell (C/S-S-J).

OKLAHOMA

Bartlesville — Tachet des Combes, Henri Hubert (A).
Oklahoma City — Atwood, John Horton (J); Parks, George Benjamin (C/S-J-M).
Tulsa — Bauman, Willard Edward (C/S-A-M); Jones, Frank Owen, Jr. (J); Rowley, Donald Morrison (J); Smith, Tracy Eldridge (M); Sons, Max Cameron (M); Wells, Emmett Cochran, Jr. (M); Wilsey, Lawrence E. (J).

TEXAS

Abilene — Conselman, Frank Buckley (M); James, Jack Reagan (R,C/S-S-J); Kralis, Dan Frank (C/S-A-M); West, Carl Kenneth (J).
Athens — King, Tyrus Raymond (C/S-S-J).
Beeville — Cummer, William Francis (M).
Bellaire — Tronolone, Victor John (J).
Chico — Koontz, Roderick Winsler (R,C/S-S-M).
Corpus Christi—Culberson, Jack Warren (J); Granberry, Raymond James (C/S-J-M); Owens, Frank E. (M); Plaza, Joseph Brewer (C/S-A-M).
Dallas — Fletcher, Paul Bernard (M); Lee, John A. (M); Murphy, John (J); Savins, Joseph George (J); Wilkins, George Edward, Jr. (M).
Electra — Herring, Julian Carver (C/S-S-J).
Fort Worth — Folmar, Laurie North (C/S-A-M).
Harlingen — Green, Francis Leon (C/S-S-J).
Houston — Brackbill, Robert Marshall (C/S-J-M); Cheatham, Frank Morris (R,C/S-S-J).
Kilgore — Hurd, Robert Henry (M).
Longview — Squyres, Frank Wilbur (R,A).
Midland — McMillian, John Guy (J); Stites, Wilbur Daniel (J).
Odessa — Sinclair, Bruce Albion (J).
Raymondville — Thompson, Richard Dean (R, C/S-S-J).
Snyder — Green, Nathan Earl (A).
Victoria — Haeger, Clarence H. (A).
Wichita Falls — Belknap, William Bernhard (J); Bussell, Robert Q. (R,C/S-S-J); Stephens, Thomas Frederick (R,C/S-S-J).

CANADA

Calgary — Brusset, Henry Louis (C/S-S-J); McPherson, William John (M). ★ ★ ★

HAVE YOU CHANGED YOUR ADDRESS?

In order that publications and correspondence may reach you promptly, the Petroleum Branch, AIME, should be advised as soon as possible of any change in your address, preferably a month before the change becomes effective. For the AIME directory and for the Personals column of the JOURNAL OF PETROLEUM TECHNOLOGY, additional information is desired. The form below is provided for your convenience, and should be sent to Petroleum Branch, AIME, 800 Fidelity Union Bldg., Dallas 1, Tex.

Name_____ Membership No._____

Old Address_____

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New Address_____
for
Publications _____

Title or Position Held_____

Address for _____
Directory
Listing _____

List below your former title or company position, nature of your new position, or other information of interest to your associates for publication in the JOURNAL OF PETROLEUM TECHNOLOGY.

_____

_____

_____

U. of Michigan Sets Phase Behavior Course

An intensive course designed for young engineers in industry who are about to enter work involving phase behavior is planned for June 16-30 at the University of Michigan. Others who have had contact with phase behavior problems over a period of years, but who desire to be brought up to date on the subject may wish to enroll in the course.

There will be four areas of concentration: (1) Phase rule and its application to hydrocarbon systems, by L. O. Case, professor of chemistry; (2) The separation of azeotropic mixtures, the underlying principles of non-ideal solutions and calculations which are made for designing fractionating systems, by R. R. White, professor of chemical engineering; (3) Low temperature processing, a review of the data available and applications to the separation of liquids from natural gases at low temperatures by Brymer Williams, associate professor of chemical engineering, and (4) Phase behavior in petroleum reservoirs, a study of techniques and data available for treating reservoir systems at high pressures, by Donald L. Katz, professor of chemical engineering.

Immediately following the intensive course, a two-day research conference will be held. The purpose of this conference is to exchange ideas on laboratory procedures, discuss correlations of data, and have a general review of the current status of our knowledge and needs. One day will be given to papers on recent researches in the field. Preprints of the papers will be available at the conference.

Registration must be made by April 15 for the intensive course, and the fee is $125.

Correspondence concerning the intensive course or conference should be directed to Donald L. Katz, 2028 East Engineering Building, Ann Arbor, Mich. ★ ★ ★

United States Review

Continued from Page 14, Section 1

oil during the year. A comparison of development activity for 1951 and 1952 is given in the following table:

	1951	1952*
Oil Wells Completed	1,676	1,977
Initial Production, Average B/D per Well	112	175
Gas Wells Completed	38	35

*Preliminary Estimate

Wells Producing

By the end of 1952, there was a total of 36,607 crude oil wells in the state, of which 30,964 were producing. This is 1,340 more producing wells than in 1951.

In California, 538 exploratory wells were drilled, of which 417 were new field and pool woldcats. A total of eight new oil fields, three gas fields, and 20 new pools were discovered during the year.

Based on data available at this time, it is doubtful if the reserves of the discoveries listed above will equal the year's production. However, it is believed that the total reserve picture for California will show an increase during the year when adjustments in old fields are considered. The history of discoveries in California for the past decade has shown that the reserves and production of the state are maintained by the cumulative effect of many moderate sized fields and pools discovered each year.

Dry Gas Discoveries

The three new dry gas discoveries of 1952 are of doubtful commercial value. One deeper pool discovery and one extension may prove to be of significant importance.

OTHER PACIFIC COAST STATES

Exploration activity in the Great Basin area of Nevada declined markedly from the previous year. However, geologic investigations and drilling picked up in Washington, Oregon and Arizona. During the year, a minimum of five wells were drilled in these states.

Petroleum Supply and Demand

The Pacific Coast industry continued its outstanding contribution to the war effort and the defense program in 1952 and, in addition, met the requirement of the rapidly expanding civilian economy on the Pacific Coast. In supplying the increasing demands of the civilian economy plus a share of the military requirements, the West Coast industry was forced to resort to relatively high cost imports of crude oil from other areas.

In spite of increased drilling efforts, crude oil production in California increased only 1.4 per cent above 1951, to an average of 982,000 B/D. Natural gas liquids production was 81,000 B/D. Total imports of raw materials were 46,000 B/D, making a total raw material supply of 1,109,000 B/D. On the demand side, domestic demand continued to increase and averaged 942,000 B/D. There were divergent trends, however. Fuel oil, for instance, decreased one per cent from 1951 levels. Although military requirements were in the neighborhood of 140,000 B/D on the Pacific Coast, actual liftings were about 78,000 B/D. The balance was presumably made up by liftings on the Gulf Coast. Offshore shipments continued to decrease as a result of the gradual easing of the worldwide petroleum supply situation and were about 86,000 B/D for the full period. The resulting total petroleum demand decreased from the 1,126,000 B/D of 1951 to 1,105,000 B/D in 1952, a decrease of nearly two per cent. Inventories of total petroleum increased 12,200,000 bbl from the uncomfortably low levels of 1951 to 96,400,000 bbl at the end of 1952.

Africa Review

Continued from Page 31, Section 1

BRITISH AND ITALIAN SOMALILAND

During 1952, a concession was taken out in British Somaliland by Conoco Somal, Ltd. In this country, Amerada, Continental, and Ohio Oil companies each have one-third interest. In Italian Somaliland a group company made up of Sinclair (50 per cent), Amerada, Continental, and Ohio, each owning one-sixth, have taken out a concession and are preparing to undertake geological reconnaissance and gravity-meter surveys.

EAST AFRICA

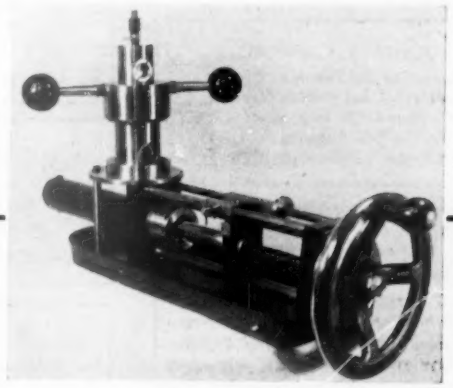
In East Africa, the D'Arcy Exploration Co. (Anglo-Iranian) along with Shell, will undertake a broad program of geological and geophysical surveys. Preliminary aerial photography is now being flown. The area to be covered is the coastal part of Tangiers and the photography will later be extended to Zanzibar and Pemba Island, and to parts of Kenya.

MOZAMBIQUE

Gulf Oil Co. interests have taken a large concession in the southern part of Mozambique. After extensive geological and gravity surveys, the first exploratory well has now been commenced.

NIGERIA

In South Nigeria, Shell-D'Arcy interests are active and have completed two wells north of Port Harcourt. Additional drilling is contemplated in this area. ★ ★ ★



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College Station, Texas

University of Oklahoma Announces Fellowships

Five graduate fellowships have been announced for the academic year 1953-54 at the University of Oklahoma. Holders of the fellowships will be candidates for the master's degree in petroleum engineering.

The grants are in amounts from $1,200 to $1,500, with $300 to $1,000 additional allowed for fees, purchase of research equipment and similar expenses.

Fellowships offered for general graduate study have been established by the Shell Oil Co. and affiliate Shell companies, and by the Humble Oil and Refining Co. Special fields of research specified by the other three grants are secondary recovery, the Sinclair Refining Co.; displacement of oil from reservoir material, the Stanolind Oil and Gas Co.; and well completions, Lane-Wells Co.

Applicants should hold a bachelor's degree in petroleum engineering or a related field from an accredited school. Additional information regarding the fellowships may be obtained from H. W. Benischek, School of Petroleum Engineering, Faculty Exchange, University of Oklahoma, Norman, Okla. Deadline for applications is April 15. ★ ★ ★

Employment Notices

The JOURNAL will post notices of men and jobs available. Companies and AIME members are invited to use this space, for which there is no charge. Except as noted below, address replies to: Code (appropriate number), JOURNAL OF PETROLEUM TECHNOLOGY, 800 Fidelity Union Bldg., Dallas 1. Show return address on envelope. These replies will be forwarded unopened and no fees are involved.

Replies to the positions coded Y8049, Y7768, Y7835 and P-4 below should be addressed to: Engineering Societies Personnel Service, 8 West 40th St., New York 18, N. Y. The ESPS, on whose behalf these notices are published here, collects a fee from applicants actually placed.

PERSONNEL

♦ Graduate petroleum engineer, seven years' experience in drilling, production and administrative work with major and independent firms. Have experience with primary and secondary methods of production. Desire connection anywhere in continental North America with aggressive organization. Married, age 29, presently employed. All offers acknowledged. Code 186.

♦ Petroleum engineer, married, 35, two children, eight years' experience in production and drilling in Texas and Louisiana Gulf Coast. Past four years employed as production and drilling superintendent. Prefer supervisory position in production or production and drilling for active independent. Code 187.

♦ Petroleum engineer, single, 32, graduate of University of Texas in 1949, A.S.T.P. course in mechanical engineering at Georgia Tech, one and one-half years of law school. Two years in completion and evaluation work. Desire position in evaluation and reservoir study with progressive independent or consulting firm in Dallas. Excellent references. Code 188.

♦ Geologist-engineer, age 35, experienced in valuation of drilling prospects and producing properties, production engineering, leasing and deal negotiations. Wide acquaintance in petroleum industry and risk capital groups. Graduate geologist, University of Tulsa, 1939. Desires position with independent company or individual. All replies acknowledged. Code 189.

♦ Geologist, MS, excellent experience in seismograph interpretation and also in petrographic work. Desires position as subsurface petroleum geologist or research geology. P-4.

POSITIONS

♦ The Pennsylvania State College has the following staff positions open: (a) Professor or instructor in petroleum engineering to teach upperclass and graduate courses in mechanical and operational methods in petroleum production, drilling, transportation, etc. Should have MS degree as petroleum, mechanical or other qualified engineer, plus field experience. Appointments permanent. Contract for 12 months rather than academic year. Salary open. (b) Research project supervisor, to assume leadership of research project in fundamentals of oil recovery and graduate student research, plus teaching of limited number of graduate courses. PhD required. Former experience in petroleum production research not necessary if properly qualified otherwise. Service period is 12 months. Salary open. (c) Graduate assistants, to assist in undergraduate laboratories and on research projects. Must qualify as a graduate student in petroleum and natural gas engineering. Ten and 12-month appointments available at $122 per month. Graduate enrollment for two-thirds of a normal load permitted. Apply direct to Division of Petroleum and Natural Gas Engineering, The Pennsylvania State College, State College, Pa.

♦ Engineers. (a) Concrete designers, experienced in oil refinery, chemical plant or steel mill design or similar heavy construction. Should be civil engineers, either graduates or equivalent in education and experience. (b) Structural designers with same qualifications as above. (c) Process design engineers, young, recent chemical graduates, with some experience in oil refinery process design or interested in getting into this type of work. (d) Estimators experienced in oil refinery design, capable of taking off quantities and writing specifications. Locations, Ohio. Y8049.

♦ Maintenance design engineer, 25-30, chemical or mechanical engineering graduate, with chemical or oil refining experience, to prepare plans and procedures covering plant maintenance and alteration in oil refinery. Salary, $4,800-$6,000 a year. Location, northern New Jersey. Y7835.

♦ Sales engineer, 35-40, with some knowledge of lubrication problems in the mill and factory trade. Will do some engineering as well as sales. Salary plus commission. Location, New York, New Jersey and Connecticut. Applicants from these areas preferred. Y7768. ★ ★ ★

Personals

RICHARD W. HARDING is now a petroleum geologist with the Skelly Oil Co. in Shreveport, La. He was formerly employed by the Quaker State Oil Corp. in Bradford, Pa.

+

HARTLEY C. GLEASON has become manager of production and drilling for The Crusader Corp. of Denver, Colo. He will be located in Casper, Wyo., and will also supervise production and drilling activities of Morton Oil Co., a Crusader subsidiary. Gleason was formerly production engineer in charge of the Rocky Mountain district for the British American Oil Co., with whom he had been associated since June, 1947. Prior to that time he had been with Magnolia Petroleum Co. and Stanolind Oil and Gas Co.

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OIL WELL SURVEYS

L. C. STEVENS has recently been appointed a director and vice-president in charge of production of the Socony-Vacuum Exploration Co. of Canada. Stevens joined Socony's Calgary staff as chief petroleum engineer, in July, 1951, and was appointed production manager in August, 1952. He was formerly with the Shell group and saw over 20 years of service in Roumania, Trinidad, North and South America, The Hague, and London. At the time of his resignation from Shell he was chief engineer in Maracaibo, Venezuela. He is a graduate of Birmingham University, England.

+

LEONARD G. MORELAND, JR., a lieutenant in the U. S. Navy Reserve, has been transferred to Fort Worth, Tex., from Lafayette, La. He has served as a naval aviator for two years, and prior to that time was a sales engineer for the Maloney-Crawford Tank Co.

+

TYLER BRINKER has accepted a position as a trainee engineer with the Union Oil Co. of California and will be located in Whittier. He was recently released from active duty with the U. S. Army.

+

LYLE L. PAYNE has been promoted to assistant vice-president, engineering, for the Hughes Tool Co. in Houston, Tex. Formerly in charge of the product engineering department, he has been with Hughes since 1929. He was graduated from Rice Institute in June, 1930.

+

SHANNON L. MATHENY, JR., a petroleum engineer trainee with Continental Oil Co., has been transferred from Houston, Tex., to Seal Beach, Calif.

+

R. K. FORSYTHE has been appointed manager of the Kansas division for Schlumberger Well Surveying Corp., located in Wichita. He was formerly in Calgary, Alberta.

Water Flooding Topic Set for Kansas Meeting

A Petroleum Engineering Conference will be held at the University of Kansas, April 9 and 10.

H. G. Botset, head of the petroleum engineering department, University of Pittsburgh, will present a two-day lecture series on "Secondary Recovery by Water Flooding." An authority in this field, Botset is associated with the Penn-Grade Association of Bradford, Pa.

Lecture topics are (1) Basic physical factors affecting retention of fluids in and production from reservoir rock; (2) Factors to consider in predicting the success of a water flooding operation; (3) Injection systems, and (4) Operation of a water flood and discussion of most recent techniques for increasing recovery.

Registration for the conference will be $10 per person. Inquiries may be directed to C. R. Stephenson, University Extension, University of Kansas, Lawrence, Kans. ★ ★ ★

Membership Applicants To Receive Journals

According to new procedures adopted in the Petroleum Branch and Institute headquarters, an applicant for membership will begin to receive the JOURNAL OF PETROLEUM TECHNOLOGY immediately. Formerly, magazines were sent only after the application was processed and approved(which might cause a delay of several months.

The Petroleum Branch office mails the current issue as soon as an application is received. At the regular monthly meeting of the Petroleum Branch admissions committee, qualified applicants are recommended for election, and final approval is made by the Board of Directors at its next monthly meeting. The magazine will be sent regularly thereafter from Institute headquarters unless the applicant fails to pay his dues upon being notified of election. ★ ★ ★

Oklahoma Student Chapter Elects New Officers

New officers of the student affiliate group of the AIME at the University of Oklahoma were elected at a recent meeting. They are Charles L. Bare, Chickasha, Okla., president; Kirk Snouffer, Frederick, Md., vice-president; Jack England, Billings, Mont., secretary; Vic Hvolboll, Perry, Okla., treasurer, and Art O'Toole, Drexel Hill, Pa., publicity and entertainment chairman. ★ ★ ★

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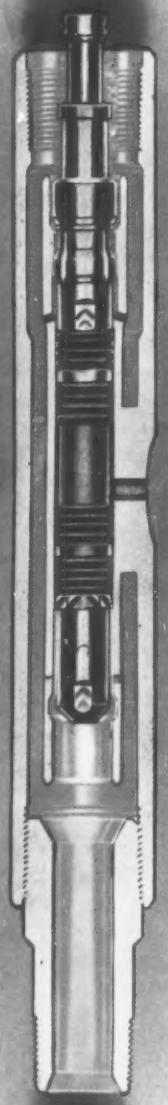

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Canada Review

Continued from Page 18, Section 1

Towards the end of the year, a Lower Cretaceous and Jurassic discovery of medium gravity oil was made at Wapella in southeastern Saskatchewan by Imperial and Tide Water, under geological conditions very similar to those in the Fosterton area 275 miles to the west.

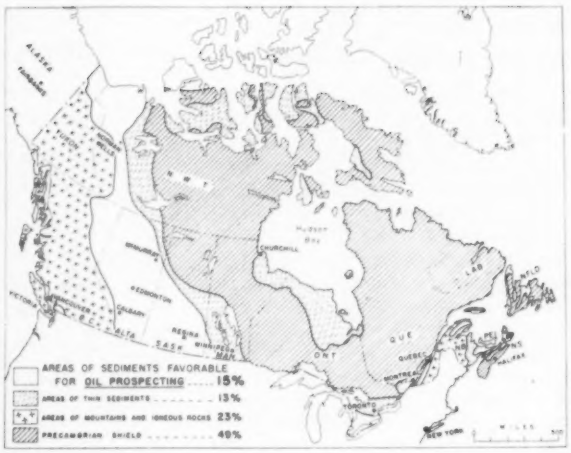
In 1951, a discovery of heavy oil was made in a sand at the base of the Mississippian at Coleville in west central Saskatchewan. During 1952, important extensions were made to the Coleville Field and additional discoveries were made nearby at Buffalo Coulee and Onward. These discoveries,* added to previous known occurrences from the Athabaska Tar Sand area southeast through the Lloydminster fields, emphasize the large potential reserves of heavy oil in Western Canada and pose great processing and economic problems.

In southwestern Manitoba, a number of light gravity oil discoveries in the Mississippian followed on the heels of the 1951 discovery at Daly. The discovery incidence was impressively high although production problems resulting from low permeability and water invasion are serious.

EASTERN CANADA

In Eastern Canada, production and exploration activity continued at about the same modest pace as in the past several years. Most of the activity continued to be in southwestern Ontario where oil production averaged about 530 B/D and gas production averaged about 41 MMcf/D. Four small gas fields and three extensions were discovered in the Silurian and two oil pools and one extension were discovered in the Devonian.

*Most of the discoveries in the Coleville area have been made by Canada Southern.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Europe Review

Continued from Page 27, Section 1

of fields, principally located in the Po River Valley. Some private operators are entering the field and it has been estimated that in a short time the production of natural gas will be raised to 170 billion cu ft per year. Prior to 1952, the gas distributing system totalled 788 miles. During 1952 an additional 1,285 miles of gas lines were constructed, and it is reported that an additional 900 miles are to be built during 1953. Industrial users consume more than 80 per cent of the gas production, the remainder going to automotive traction (compressed bottled gas), for domestic use and for heating. The distributed price of gas for domestic use results in an economy of 40 to 50 per cent over coal and 10 to 30 per cent over the cost of fuel oil.

SICILY

In Southeast Sicily, concessions have been taken out by three groups, Gulf interests, McMillan Oil Co. and Anglo-Iranian interests. Geological field work has progressed during the year and it is believed that Gulf will commence drilling in 1953.

SPAIN

An American group concluded an agreement with the Spanish National Institute of Industry last fall for exploration work in the Ebro Valley of northern Spain. The concession covers an area of approximately 180,000 acres in a strip some 50 miles long and averaging five miles wide southeast of the town of Logrono. The venture is known as Valdebro.

Geologic and geophysical activities had progressed by the end of 1952 to the point where a tentative location for the first well had been made. Drilling equipment capable of drilling to 12,000 ft was shipped in January, 1953, and American drilling crews followed early in February with the expectation of spudding in the first well by March 1, 1953.

The Spanish oil company CIESPA has made a contract with a firm from Germany, C. Deilmann Bergbau GMBH of Bentheim, under which geophysical and drilling equipment will be provided for exploration work in an area close to the Valdebro concession.

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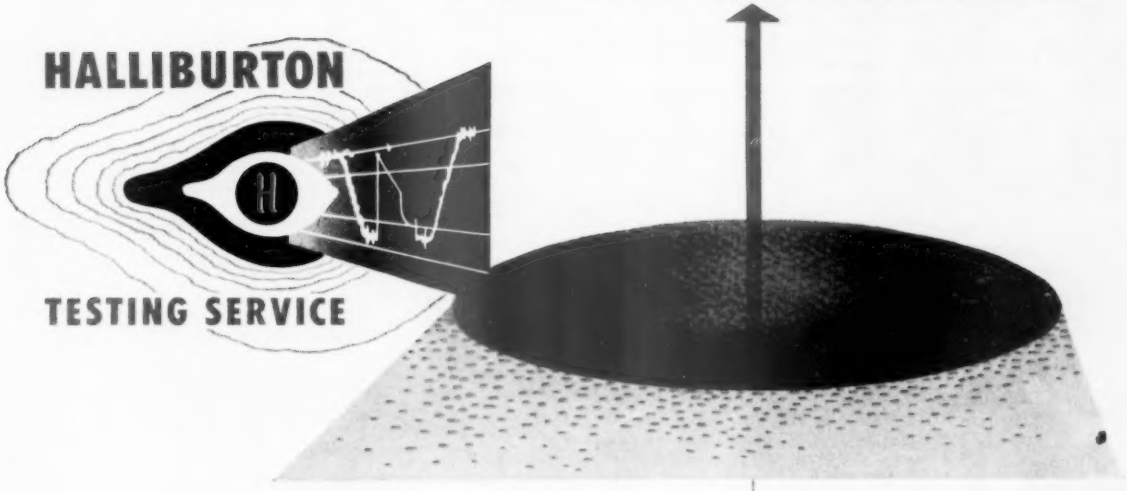

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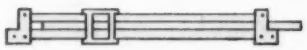

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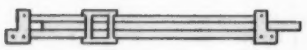

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Institute Shows $18,065 Surplus

AIME income for 1952 totaled $593,381, compared with $522,076 in 1951, and expenses amounted to $575,315, compared with $514,067 in the previous year. The surplus was therefore $18,065. Of this amount, $10,000 will be returned to the Special Fund for Publications, which was almost wiped out during the years of deficits, and the rest credited to surplus account. All of the expense for the Directory, which was not issued in 1951, was charged in the 1952 accounts though not actually mailed until 1953. This totaled $20,542, including the entire labor expense of the Flexoprint installation which permitted the Directory itself to be printed for about half of the cost heretofore incurred. It is planned to publish the Directory annually hereafter, beginning about June, 1954; a supplement will be issued in June, 1953, with the names of the committee personnel and Local Section, Division and Branch officers for the current year.

On a Branch accounting basis, the Mining Branch had a surplus of $27,075; the Petroleum Branch a surplus of $6,850, and the Metals Branch a deficit of $20,860, largely because of the relatively large volume of physical metallurgy papers. ★ ★

Societies Sponsor Education Study

AIME is contributing $400 to Engineers Council for Professional Development for a special study of the adequacy and standards of engineering education. Other constituent societies of ECPD are also contributing their share, and the Engineering Foundation is supplying $3,000. ★ ★ ★

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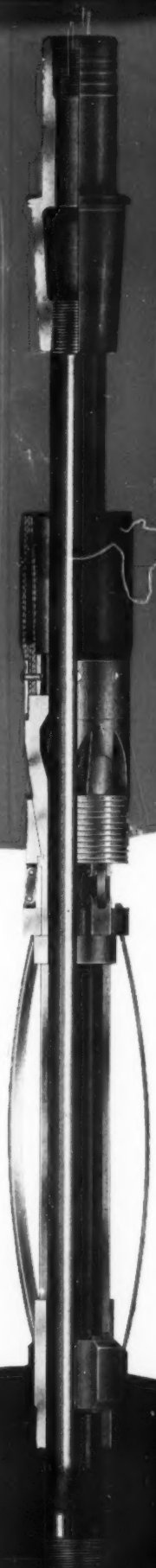
Advertisers' Index

A-1 Bit and Tool Co. . . . . *
Clausel Industrial Advertising, Houston
American Iron & Machine Works . . . . . Third Cover
Lowe Runkle Co., Oklahoma City, Okla.
B and W Incorporated . . . . . Sec. 1—5
Brennan Advertising Agency, Houston
Baash-Ross Tool Co. . . . . Sec. 1—21
Dozier-Eastman & Co. Los Angeles
Baker Oil Tools, Inc. . . . . Sec. 1—8,9
Theo. M. Martin Co. San Gabriel, Calif.
Baroid Sales Division . . . . . *
Brennan Advertising Agency, Houston
Barret, William M., Inc. . . . . *
Bozell & Jacobs, Inc., Shreveport
Clark Bros. Co., Inc. . . . . *
Harold Warner Co., Buffalo. N Y.
Cooper-Bessemer Corp. . . . . Sec. 1—28
Griswold-Eshleman Co., Cleveland
Core Laboratories, Inc. . . . . Sec. 1—4
Duvall Williams, Dallas
Dowell Incorporated . . . . . Sec. 1—10
MacManus, John & Adams, Inc., Detroit
Dresser Industries, Inc. . . . . *
Laughlin, Wilson, Baxter & Persons, Dallas
Eastman Oil Well Survey Co. . . . . Sec. 2—8
Ted Workman Advertising, Dallas
Geolograph Co., Inc. . . . . Sec. 2—12
Lowe Runkle Co., Oklahoma City
Geological Well Service Co. . . . . Sec. 2—10
Halliburton Oil Well Cementing Co. . Sec. 1—1, Sec. 2—11
Hill & Christopher, Los Angeles
Hughes Tool Co. . . . . *
Foote, Cone & Belding, Houston
Hycalog Co. . . . . *
Glenn Mason Advertising, Shreveport
Infilco, Inc. . . . . *
Ruthrauff & Ryan, Inc., Hollywood, Calif.
International Petroleum Exposition . . . . . Sec. 1—22
Gibbons Advertising Agency, Inc., Tulsa
Johnston Testers, Inc. . . . . Sec. 1—32
Wallace Davis & Co., Houston
Keystone Development Corp. . . . . *
Brennan Advertising Agency, Houston
Kobe, Inc. . . . . Sec. 1—6
The McCarty Co., Los Angeles
Lane-Wells Co. . . . . Fourth Cover
Darwin H. Clark Co., Los Angeles
Lufkin Foundry & Machine Co. . . . . Sec. 1—15
A. E. Cudlipp. Lufkin, Texas
Magnet Cove Barium Corp. . . . . *
Rives, Dyke & Co., Houston
McCullough Tool Co. . . . . Sec. 1—7
R. P. Casterline, Los Angeles
Mission Manufacturing Co. . . . . Sec. 1—26
Rives, Dyke and Co., Houston
Moore, Lee C., Corp. . . . . *
Watts, Payne Advertising, Tulsa
Otis Pressure Control, Inc. . . . . Sec. 2—9
Dan Goodrich, Dallas
Pelton Water Wheel Co. . . . . *
Edward A. Stratman, Huntington Park, Calif.
Professional Services . . . . . Sec. 2—6,7
Reed Roller Bit Co. . . . . Sec. 1—2
Brennan Advertising Agency, Houston
Ruska Instrument Corp. . . . . Sec. 2—5
Brennan Advertising Agency, Houston
Schlumberger Well Surveying Corp. . . . Second Cover
Rives, Dyke & Co., Houston
Second National Bank of Houston . . . . . *
Gano, Bachrodt, Edwards, Inc., Houston
United Geophysical Co., Inc. . . . . *
Dozier, Eastman and Co., Los Angeles
Welex Jet Services, Inc. . . . . *
Evans & Associates, Fort Worth
Well Reconnaissance, Inc. . . . . Sec. 1—16
Industrial Advertising Service, Dallas
Western Geophysical Co. . . . . Sec. 1—8
L. J. Swain Advertising, Whittier, Calif.
Zublin Flexible Drill Pipe . . . . . *
Roy F. Irvin Advertising, Los Angeles
*In Previous Issues



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